United States
Environmental Protection
Agency

Region 10
1200 Sixth Avenue
Seattle WA 98101

Alaska
Idaho
Oregon
Washington

EPA

October 17, 1990

Reply To
Attn Of: HW-113

CERTIFIED MAIL RETURN RECEIPT REQUESTED

J.P. Hyland
Manager, Environmental Protection
Monsanto Company
800 N. Lindbergh Blvd., M/S - G4W7
St. Louis, MO 63167

Re: Monsanto Chemical (Soda Springs) Superfund Site

Dear Mr. Hyland:

The United States Environmental Protection Agency (EPA) has documented the release or threatened release of hazardous substances, pollutants and contaminants at the Monsanto Chemical (Soda Springs) Superfund Site (Site) in southeastern Idaho. EPA is preparing to initiate a remedial investigation/feasibility study (RI/FS) to determine the nature and extent of the release and threatened release at and from the Site and evaluate possible remedial actions. Unless EPA determines that a potentially responsible party (PRP) will properly and promptly perform the RI/FS, EPA will undertake this activity pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, (CERCLA), 42 U.S.C. §§ 9601-9675, as amended.

EPA has information that the Monsanto Company and the Monsanto Chemicals Company are PRPs for the Site. Responsible parties under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a), include: Current owners and operators of the Site; former owners and operators of the Site at the time of disposal of any hazardous substances; persons who owned or possessed hazardous substances released at the Site, and arranged for disposal, treatment or transportation of such hazardous substances; and persons who accepted hazardous substances released at the Site for transportation for disposal or treatment to a facility selected by such transporter. In accordance with Section 122(e) of CERCLA, 42 U.S.C. § 9622(e), this letter is written to notify your company of its potential liability with respect to the Site, and to determine whether your company is willing to conduct the RI/FS. At this time, EPA is aware of no other PRPs for the Site.

Pursuant to Section 122(e), a moratorium on EPA's

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commencement of the RI/FS will be in effect for a period of ninety (90) calendar days following your receipt of this letter, provided that within the first sixty (60) days of the moratorium, your company makes a good faith offer to perform the RI/FS. The purpose of the additional thirty (30) days is to allow parties adequate time to finalize an agreement. If a good faith offer is not made within the first sixty (60) days, EPA may thereafter proceed with a federally-funded RI/FS, or may issue a unilateral administrative order pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a), requiring your company to conduct the RI/FS. Any agreement to conduct the RI/FS must be memorialized in an administrative order on consent issued by EPA pursuant to CERCLA.

Pursuant to Section 107 of CERCLA, 42 U.S.C. § 9607, your company would be liable for the costs of a federally-funded RI/FS, as well as the costs of any other actions deemed necessary by EPA to protect the public health, welfare or the environment from an imminent and substantial endangerment due to an actual or threatened release of a hazardous substance at or from the Site. Such costs can include, but are not limited to, expenditures for planning, investigation, studies, clean-up, and enforcement.

A good faith offer must include a definite start date and time lines for implementing and conducting the following activities:

1. A Remedial Investigation to identify the geological and hydrogeological characteristics of the Site, and to define the nature and extent of soil, air, ground and surface water contamination, and

2. A Feasibility Study to develop and evaluate possible remedial actions to remove or contain hazardous substances, pollutants, and contaminants at and/or from the Site.

A good faith offer is a written proposal which demonstrates your company's qualifications and willingness to conduct or finance the RI/FS, and should include the following:

1. A statement of willingness to conduct or finance the RI/FS which is consistent with EPA's enclosed Statement of Work and draft Administrative Order On Consent and provides a sufficient basis for further negotiations;

2. A paragraph-by-paragraph response to EPA's draft Administrative Order On Consent (i.e., a "red-lined version. Do not submit a proposed alternative draft Order);

3. A demonstration of technical capability to perform the RI/FS. Include the name of the contractor selected to conduct the RI/FS, and a summary of the contractor's qualifications;

4. A demonstration of financial capability to finance the RI/FS;

5. A statement of willingness to reimburse EPA for the costs EPA incurs in overseeing conduct of the RI/FS as required by Section 104(a)(1) of CERCLA, 42 U.S.C. § 9604(a)(1); and

6. The name, address, and phone number of the person(s) who will represent your company in RI/FS negotiations.

To facilitate the preparation of a good faith proposal within sixty (60) days, EPA is willing to meet with representatives of your company to discuss this matter. Should such a meeting be desirable, please contact John Meyer, EPA Superfund Site Manager, at (206) 442-1271.

Except under extraordinary circumstances which must be documented in a written request, no extension beyond sixty (60) days will be considered by EPA. Please be further advised that this Special Notice does not preclude EPA from performing other studies or investigations pursuant to Section 104 of CERCLA, 42 U.S.C. § 9604, and that pursuant to Section 122(e)(6) of CERCLA, 42 U.S.C. § 9622(e)(6), specific authorization is required from EPA prior to undertaking any remedial action.

Following completion of the RI/FS and any other necessary studies, EPA will determine the appropriate remedial action for the Site. EPA's remedy selection will be documented in a Record of Decision (ROD) following public comment. Your company may then be contacted again to undertake implementation of the remedy, and possibly the design thereof.

A written response and any request for further information regarding this letter should be addressed to:

John Meyer, Superfund Site Manager
U.S. EPA, Region 10 (HW-113)
Seattle, Washington 98101
(206) 442-1271

However, any and all communications by any attorney(s) on behalf of your company must be directed to the Office of Regional Counsel, EPA Region 10. Please direct such inquiries regarding this Site to Charles Ordine, Assistant Regional Counsel, at (206) 442-1504.

EPA strongly encourages negotiated agreements with PRPs for the conduct of a RI/FS. We hope you will give this matter your immediate attention. By a copy of this letter, EPA is notifying the State of Idaho and the Natural Resource Trustees of our

intent to enter negotiations for a RI/FS at this Site.

Sincerely,

Charles E. Findley, Director
Hazardous Waste Division

Enclosure

cc: Dean Nygard, IDHW-DEQ
Charles Polityka, U.S. Department of the Interior
Kent V. Lott, Monsanto Chemicals Company

DRAFT - SUBJECT TO FURTHER GOVERNMENT REVIEW

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10

IN THE MATTER OF: MONSANTO CHEMICAL (SODA SPRINGS) SITE MONSANTO COMPANY, RESPONDENT Proceeding Under Sections 104, 122(a), and 122(d)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act as amended, 42 U.S.C §§ 9604, 9622(a), 9622(d)(3)).	U.S. EPA Docket No.___

ADMINISTRATIVE ORDER ON CONSENT
FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY

I. INTRODUCTION

1. This Administrative Order on Consent ("Order") is issued by the United States Environmental Protection Agency ("EPA") to the above-captioned Respondent to provide for the performance and preparation of a Remedial Investigation and Feasibility Study ("RI/FS") for the above-captioned Site; and for the reimbursement of EPA for all costs incurred by EPA in connection therewith.

II. JURISDICTION

2. This Order is issued under the authority vested in the President of the United States by Sections 104, 122(a) and 122(d)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), as amended, 42 U.S.C. §§ 9604, 9622(a), 9622(d)(3). This authority was delegated to the

Administrator of EPA on January 23, 1987, by Executive Order 12580, 52 Fed. Reg. 2926 (1987); further delegated to the EPA Regional Administrators on September 13, 1987, by EPA Delegation No. 14-14-C; and redelegated by the Regional Administrator to EPA Region 10 Director, Hazardous Waste Division.

3. Respondent agrees to undertake all activities required by this Order. In any action by EPA or the United States to enforce this Order, Respondent consents to, and agrees not to contest, the authority or jurisdiction of EPA, in accordance with the delegations set forth above, to issue or enforce this Order, and agrees not to contest the validity of this Order or its terms.

III. PARTIES BOUND

4. This Order shall apply to and be binding upon Respondent, its successors, and assigns. Respondent shall further be responsible for ensuring that all of its officers, directors, principals, subsidiaries, employees, agents, contractors, consultants, subcontractors, attorneys, and any other persons or entities acting for or on behalf of Respondent with respect to the implementation of this Order, fully comply with this Order. Where this Order creates duties upon Respondent, any directory language, including the words "will," or "shall", when used in reference to any action to be taken by EPA, is intended only, and shall be interpreted, as condition(s) precedent to Respondent's duty(s), and not as any duty of EPA to act, or to act within a specified time period. The signatory to this Order on Respondent's behalf

certifies that he or she is authorized to execute and legally bind Respondent to this Order. No change in ownership, business organization, or other status of Respondent, or of any portion of the Site, shall alter Respondent's duties under this Order.

5. Respondent shall provide a copy of this Order to any subsequent owners or successors in interest before any ownership rights or stock or assets in a corporate merger or acquisition involving Respondent or its subsidiary, Monsanto Chemicals Company, are transferred. Respondent shall notify EPA at least thirty (30) days prior to any such transfer. Respondent shall provide a copy of this Order to all contractors, subcontractors, laboratories, and consultants retained to perform any work under this Order, within fourteen (14) days after the effective date of this Order, or the date such services are retained, whichever is later.

IV. STATEMENT OF PURPOSE

6. The objectives of this Order are: (a) to determine the nature and extent of contamination at and from the Site, and the nature and extent of any threat to the public health, welfare, or the environment presented by the release or threat of release of hazardous substances, pollutants or contaminants at or from the Site, by conducting a remedial investigation; (b) to determine and evaluate alternatives for remedial action to prevent, mitigate or otherwise respond to any release or threat of release of hazardous substances, pollutants, or contaminants at or from the Site, by conducting a feasibility study; and (c) to provide for recovery by

EPA of its response and oversight costs incurred with respect to the Site and the implementation of this Order.

7. The activities required by this Order are subject to approval by EPA and shall provide all necessary and appropriate information for the RI/FS, and for the preparation by EPA of a Record of Decision ("ROD") in accordance with the requirements of CERCLA, as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300, as amended. The activities conducted pursuant to this Order shall be conducted in compliance with all applicable EPA guidances, policies, and procedures.

V. FINDINGS OF FACT

8. The Monsanto Chemical (Soda Springs) site (hereinafter and hereinbefore referred to as the "Site") includes an elemental phosphorus plant (the "Plant") located approximately one (1) mile north of the City of Soda Springs, Idaho on an approximately 540 acre property owned and operated by Respondent, its subsidiaries or predecessors since 1952, in portions of Sections 29, 30, 31, and 32, Township 8 South, Range 42 East of the Boise Meridian, bordering State Highway 34. Respondent purchased the Plant property from various grantees in 1951 and 1952, who had used it for agricultural and domestic purposes. No other industrial or significant activity is known to have occurred at or on the Plant property. The Site encompasses the areal extent of contamination and all suitable areas in close proximity to the contamination

deemed necessary by EPA for implementation of any response action.

9. Respondent is a corporation organized and existing under the laws of the State of Delaware, with principal offices in St. Louis, Missouri, and doing business in the State of Idaho. Monsanto Chemicals Company is a corporation organized and existing under the laws of the State of Idaho, and a wholly owned subsidiary of Respondent.

10. The Plant is approximately twelve (12) miles south of the Blackfoot Reservoir, and 2000 feet east of Soda Creek in a broad semi-arid rural valley with mixed agricultural, residential, and industrial uses. Soda Creek is the main drainage system near the Plant. It flows southward into the Soda Point Reservoir which abuts the southeast corner of the City of Soda Springs. Soda Creek is a major tributary of Bear River which flows in a generally southwesterly direction from Soda Springs. The basalt of the Blackfoot Lava Field, fed in part by the Blackfoot Reservoir, is the principal water formation in the area. Its water is used for domestic, livestock, irrigation, municipal, commercial and industrial purposes. Soda Springs obtains its municipal water supply from three (3) springs which issue from this aquifer. Ground water drawn from public and private wells within three (3) miles of the Plant provides potable water to a population of approximately 3,500 to 4,000 people, and is used to irrigate approximately 4,700 acres of farmland. Total depths of domestic wells range between 19 and 400 feet below ground surface. Plant operations use on-Site well water. There is no known alternate

supply of potable water in the area. The groundwater in the upper and lower basalt zones generally flows to the south. However, previous studies suggest that a complex hydrogeological environment exists in the Soda Springs area. Faulting and regional ground water discharge areas influence the water flow pattern, and to date, local effects have not been precisely determined. The folding, faulting, and rugged topography have created a myriad of complex, discrete flow systems. Hydraulic connections among area potable and non-drinking ground water sources via basalt fractures and joints are probable.

11. In April 1988, following an inspection of the Site, including sampling and analysis, and a review of prior investigations, a Site Inspection Report ("Report") was prepared by an EPA contractor. Among other things, the Report concluded:

A. Ground water under the Plant property is contaminated by various metals and ions. Elevated levels of hazardous substances including: cadmium, chromium, manganese, selenium, arsenic, vanadium, zinc, nickel, phosphorus, fluoride, chloride, and sulfate were detected in monitoring wells on the Plant property. Both the upper and lower basalt zones evidenced contamination.

B. The sources of the contaminants in the upper basalt zone included the underflow solids pond, the northwest pond and the hydroclarifier. The plumes generally follow the predominant south-southeast ground water flow direction. A fluoride plume is the most widely dispersed. Selenium, vanadium, zinc, and

sulfate were also detected beyond the Plant property.

C. None of the contaminants in the upper basalt zone were detected immediately southeast of Plant production wells. The cone of depression created by numerous on-Site wells appears to intercept further southeasterly plume transport.

D. The contaminants detected in the lower basalt zone include cadmium, selenium, fluoride, chloride and sulfate. The plumes appear to extend southeast from the old underflow solids area, and are generally smaller and less concentrated than those in the upper basalt zone.

E. A separate plume of chloride, sulfate, and vanadium may exist under the southeastern portion of the Plant property, which may originate east of the Plant property.

F. The Plant property includes landfills containing hazardous substances including thirty-two (32) tons of vanadium pentoxide, asbestos containing insulation, construction debris and other wastes. It was not apparent that these landfills were a source of contamination detected at the Site.

12. The Report also identified the following eight (8) waste streams produced by Respondent's Plant operations, some of which have contributed, and may be continuing to contribute, to the contamination of the Site:

A. Calcium Silicate Slag. This slag constitutes the greatest quantity of waste produced by the Plant. The molten slag is tapped from the base of the furnaces and poured out to cool in piles which cover a large portion of the Plant property,

and are greater than 150 feet in height.

B. Ferrophos Slag. This slag is cooled in separate piles and stored on a concrete pad. It is later sold to Kerr-McGee Chemical Corporation for recovery of its vanadium content.

C. Kiln Dust Slurry. A wet scrubber is used to remove particulates from the rotary kiln exhaust gas. The resultant slurry is sent to a hydroclarifier for settling and then to a filter for dewatering. Excess water is recycled back to the wet scrubber. Occasionally, the now bentonite-lined underflow solids ponds are used for dewatering when the filter is not in operation. Previous ponds were unlined. In 1985, the hydroclarifier was discovered to be leaking and was replaced with a new system which includes a leachate collection system and synthetic liner.

D. Phossy Water. Elemental phosphorus is condensed in a spray tower. The liquid phosphorus is then sent to storage and rail cars under a water seal. The spray tower, storage and rail car displacement waters directly contact phosphorus, and are termed "phossy water". All phossy waters are sent to the hydroclarifier for lime treatment to remove residual elemental phosphorus. The bentonite-lined phossy water surge pond is for surge capacity when the hydroclarifier is unavailable.

E. Electrode Seal Water. This separate water system prevents furnace gases from escaping at the point where the electrodes enter the furnace. The water is cooled in the now bentonite-

lined seal water pond prior to being recycled.

F. Coke and Quartzite Slurry. Coke and quartzite dust resulting from the drier and scrubber were formerly settled out in a slurry pond. This dust is now collected in a baghouse. The former slurry pond is currently inactive and is dry, containing only sediment.

G. Non-contact Plant Cooling Water. The water is taken from Plant production wells, used to cool equipment, and discharged into Soda Creek via an effluent discharge stream. Prior to discharge, it passes through a settling pond for particulate removal. The temperature of the discharge water is permitted under Section 402 of the Federal Water Pollution Control Act, 42 U.S.C. § 1342.

H. Waste Oils. Since 1977, waste solvents generated by the facility have been containerized and removed for recycling. Prior to 1977, spent solvents were commonly mixed with waste oil and used as a dust suppressant on Plant property roads.

13. In 1985, Respondent's contractor, Golder Associates, conducted a hydrogeological investigation of the Plant property. As a part of the investigation, thirty-one (31) monitoring wells were installed around the Plant property to supplement seven (7) existing wells. Pump tests were performed on several monitoring wells and three (3) production wells. Water level measurements and water quality sampling were performed on all monitoring wells, production wells and four (4) nearby domestic wells. A conclusion of the investigation was that both basalt zones beneath the Plant

property exhibited elevated concentrations of hazardous substances including: fluoride, cadmium, selenium, chloride, sulfate, and vanadium. In response to the Golder investigation and other information, Respondent has instituted changes in plant operations in an effort to reduce ground water contamination, including:

A. The underflow solids ponds suspected to be a source of ground water contamination were taken out of service, and underflow solids were excavated and recycled.

B. The hydroclarifier process unit identified as a significant source of ground water contamination was replaced.

C. The underflow solids ponds were filled with molten slag and then sealed with a bentonite clay cap and a cover of crushed slag.

D. The northwest pond was excavated and sealed.

E. All PCB-containing transformers at the Plant were replaced.

F. Four (4) underground storage tanks containing fuel oil and gasoline were replaced with above-ground tanks.

No determination as to the adequacy or effectiveness of these activities has ever been made by EPA.

14. Potential pathways for exposure of human beings to the hazardous substances, pollutants and contaminants identified at the Site include ingestion, inhalation and dermal contact as a result of drinking, cooking, bathing, and other domestic or agricultural uses of contaminated groundwater. Ingestion, inhalation or dermal contact with the hazardous substances, pollutants and contaminants

identified at the Site can cause a wide range of significant human health effects. Specific risks presented by specific hazardous substances found at the Site include the following:

A. Cadmium is known to cause wide ranging renal and hepatic damage and dysfunction, placental destruction, anosmia, and is a suspected carcinogen. Adverse effects to the immune system, cardiovascular system, and testes have also been documented. The toxic nature of cadmium is exacerbated by its long half-life, and its high absorbtion in plants, which account for its significant bioaccumulation at the later stages of the human food chain, thereby compounding the threat it poses to human health.

B. Toxicity resulting from exposure, generally to manganese dioxide, can result in manganism, a psychiatric disorder characterized by irritability, difficulty in walking, speech disturbances, and compulsive behavior. It is caused by lesions and degenerative changes in the basal ganglia. In some cases, a syndrome similar to Parkinson's Disease may develop as a result of damage to the subthalmic nucleus and pallidum. Liver cirrhosis is also frequently observed in addition to the central nervous system changes.

C. Selenium has produced loss of fertility, congenital defects, and is considered embryotoxic and teratogenic. Chronic exposure has been demonstrated to cause hepatic and spleen damage, anemia, and gastrointestinal disorders. Chronic toxicity has produced hepatic cirrhosis and central

nervous system disorders.

D. Chromium in one of its most common forms (its hexavalent oxidation state, commonly referred to as "Cr VI") has carcinogenic effects, most especially to the lungs, and is known to cause DNA and chromosome damage, as well as skin lesions and ulcerations, and central nervous system and hepatic disorders. Cr VI is highly soluable and very mobile in water. Although generally regarded as less harmful, Cr III, the trivalent state of chromium, is a suspected carcinogen, and is more readily absorbed following ingestion in the presence of Cr VI.

E. Exposure to arsenic, classified as a Group A carcinogen by EPA, increases the incidence of skin, lung, liver and lymphoid cancer. It has been observed to cause chromosomal breakage, cytotoxic and mutagenic effects when tested in vitro. Chronic and subchronic exposures have been shown to cause carcinogenesis, cardiovascular disease, neurological disorders, various dermatoses including hyperpigmentation, disquamation and hair loss, hematopoietic depression, anhydremia, liver damage, sensory disturbances, and distal sensorimotor neuropathy with anoxal degeneration.

F. Workers exposed to vanadium compounds exhibit an increased incidence of bronchopneumonia and bronchitis. Industrial exposures to vanadium pentoxide and other vanadium compounds can cause severe gastrointestinal distress including abdominal pain, nausea and vomiting, cardiac palpitation, tremor,

nervous depression, kidney damage, and ophthalmic and dermal irritation. Experimental investigations have suggested the liver, adrenals, and bone marrow may also be adversely affected by subacute exposure. It has been postulated that heart disease can be related to vanadium air pollution, in concert with cadmium.

G. A form of dermititis called "nickel itch" is the most frequent effect of exposure to nickel. It has been estimated that as much as five (5) per cent of all eczema is caused by nickel or nickel compounds. Chronic low level exposure has been implicated epidemiologically with cancer of the lungs and nose. Nickel Sulfate may induce myocardial and liver damage. Nickel carbonyl is highly toxic.

H. Ingestion of water containing excess fluorides can lead to mottling of the teeth, most especially in children, skeletal fluorosis, gastrointestinal distress, and disorders of the central nervous system.

15. The Site was listed on the National Priorities List ("NPL") on August 30, 1990 (55 Fed. Reg. 35502).

VI. CONCLUSIONS OF LAW AND DETERMINATIONS

16. The Site is a "facility" as defined in Section 101(9) of CERCLA, 42 U.S.C. § 9601(9); the Plant is a facility within the meaning of this Section.

17. Plant wastes and constituents thereof at the Site, and substances otherwise found at the Site and identified in paragraphs

11 and 12 above, are "hazardous substance(s)" as defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), or constitute "pollutant(s) or contaminant(s)" which may present an imminent and substantial danger to public health or welfare or the environment, as set forth in Section 104(a)(1) of CERCLA.

18. The hazardous substances or pollutants or contaminants at the Site, or the past, present or potential migration of hazardous substances or pollutants or contaminants at or from the Site, constitute actual and/or threatened "release(s)" as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

19. Respondent and Monsanto Chemicals Company are each a "person" as defined in Section 101(21) of CERCLA, 42 U.S.C. § 9601(21)

20. Respondent and Monsanto Chemicals Company are each a responsible party as set forth in Sections 104, 107(a) and 122 of CERCLA, 42 U.S.C. §§ 9604, 9607(a) and 9622.

21. The actions required by this Order are necessary to protect the public health or welfare or the environment, are in the public interest, are not inconsistent with CERCLA or the NCP, and will expedite effective remedial action and minimize litigation.

VII. NOTICE TO STATE

22. Notice of the issuance of this Order, and that EPA is the lead agency for the coordination, oversight, and enforcement thereof, has been provided to the State of Idaho through its Department of Health and Welfare, Division of Environmental Quality

("IDHW").

VIII. WORK TO BE PERFORMED

23. All work performed pursuant to this Order shall be under the direction and supervision of qualified persons. Within thirty (30) days after the effective date of this Order, and before any work begins at the Site, Respondent shall submit the names, addresses, and qualifications, including experience and professional affiliations, and the proposed scope of work of all personnel, including contractors, subcontractors, laboratories, and consultants to be used in performing activities pursuant to this Order to EPA in writing. If Respondent elects to use any additional contractors, subcontractors, or laboratories subsequent to commencement of activities at the Site, Respondent shall submit the information listed in this paragraph to EPA in writing at least ten (10) days prior to any such use. If EPA disapproves any of Respondent's contractors, subcontractors, or laboratories, Respondent shall make replacement selection(s) within thirty (30) days of receipt of written disapproval from EPA. If EPA subsequently disapproves of the replacement(s), EPA may terminate this Order, conduct a complete RI/FS and/or conduct or authorize any other response activities it deems necessary, and seek costs therefor and penalties from Respondent.

24. Respondent shall conduct activities and submit deliverables for EPA review, comment, approval or modification as EPA may deem appropriate, as provided in the attached RI/FS Statement of Work,

("SOW") which is incorporated in, and an enforceable part of this Order by this reference. All such work shall be conducted in accordance with the requirements of CERCLA, the NCP, and all applicable EPA guidance, including, the "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA", EPA/540/G-89/004 (October 1988) ("RI/FS Guidance"), guidances referenced therein, and guidances referenced in the SOW, as may be amended or modified by EPA. The general activities Respondent shall perform are identified below, including various deliverables to be submitted by Respondent for EPA review and approval. The specific tasks Respondent shall perform are described more fully in the SOW and guidances. All work performed pursuant to this Order shall be in accordance with the schedules, standards, specifications, and other requirements of this Order, as initially approved or modified by EPA, or as may be amended or modified by EPA from time to time. For each and every deliverable, report, memorandum, plan, or other item referenced in any of subparagraphs "A" through "H" of this paragraph, or in any of the numbered sub-subparagraphs thereunder, if EPA disapproves or requires modification or revision of any deliverable, report, memorandum, plan, or other item, in whole or in part, Respondent shall submit a modified or revised version thereof to EPA which is responsive to all EPA directions, comments, or requirements within ten (10) days after receiving such directions, comments or requirements from EPA, unless a shorter or longer time is specified by EPA.

A. Task I: Scoping. EPA will determine the specific objectives of the RI/FS and the general management approach for the Site, as stated in the SOW. Respondent shall conduct the remainder of scoping activities as described in the SOW and referenced guidances. At the conclusion of the project planning phase, Respondent shall submit the following deliverables to EPA:

1. RI/FS Work Plan. Within thirty (30) days after the effective date of this Order, Respondent shall submit a complete RI/FS Work Plan to EPA.

2. Sampling and Analysis Plan ("SAP"). Within thirty (30) days after the effective date of this Order, Respondent shall submit a SAP to EPA which shall consist of a Field Sampling Plan ("FSP") and a Quality Assurance Project Plan ("QAPP"), as described in the SOW and guidances.

3. Health and Safety Plan ("HSP"). Within thirty (30) days after the effective date of this Order, Respondent shall submit an HSP for the Site.

Following EPA approval, or modification or revision as required by EPA, the RI/FS Work Plan and the SAP shall be incorporated in, and be an enforceable part of this Order.

B. Task II: Community Relations Plan. EPA will prepare a Community Relations Plan in accordance with EPA guidance and the requirements of CERCLA and the NCP. As requested by EPA, Respondent shall provide information supporting EPA's community relations programs related to the Site, and shall participate in public meetings which may be held or sponsored by EPA to explain

activities at or concerning the Site.

C. Task III: Site Characterization. Following EPA approval or modification of the RI/FS Work Plan and SAP, Respondent shall implement these plans to characterize the Site. Respondent shall complete this characterization of the Site within nine (9) months after Respondent receives EPA approval of the RI/FS Work Plan and SAP. Respondent shall provide EPA with analytical data in a form showing the sampling location, medium and results, within seven (7) days after the results of each sampling activity are available to Respondent or any of its employees, agents, contractors or consultants. Respondent shall notify EPA in writing within seven (7) days after completion of field activities. During Site characterization, Respondent shall submit the following deliverables to EPA, as described in the SOW and RI/FS Work Plan:

1. Technical Memorandum on Modeling of Site Characteristics. If EPA or Respondent proposes that modeling is appropriate, within twenty (20) days after such proposal, Respondent shall submit a Technical Memorandum on Modeling of Site Characteristics, as described in the SOW.

2. Preliminary Site Characterization Summary. Within twenty (20) days after completion of the field sampling and analysis, as specified in the RI/FS Work Plan, Respondent shall submit a Site Characterization Summary to EPA.

D. Task IV: Risk Assessment. Actual and potential risks to human health and the environment shall be identified and characterized by EPA in a Risk Assessment Report and an Environmental Evaluation

Report, both of which shall be incorporated into the RI Report. As requested by EPA, Respondent shall provide information for EPA's risk assessment and environmental evaluation.

E. Draft Remedial Investigation Report. Within thirty (30) days after receipt by Respondent of EPA's Risk Assessment and Environmental Evaluation Reports, or upon completion of Site Characterization, whichever is later, Respondent shall submit a draft Remedial Investigation Report in accordance with the SOW, the RI/FS Work Plan and SAP.

F. Task V: Treatability Studies. Respondent shall conduct treatability studies, except where Respondent can demonstrate in writing to EPA satisfaction that they are not needed. Major components of the treatability studies include: determinations of need for studies, the scope, design, and completion of studies, as described in the SOW. While performing treatability studies, Respondent shall submit the following deliverables to EPA:

1. Identification of Candidate Technologies Memorandum. An Identification of Candidate Technologies Memorandum shall be submitted within thirty (30) days after EPA approval of the RI/FS Work Plan.

2. Treatability Testing Statement of Work. Respondent shall submit a Treatability Testing Statement of Work within twenty (20) days after EPA notifies Respondent in writing that treatability testing shall be required, unless a shorter or longer time is specified by EPA.

3. Treatability Testing Work Plan. Within twenty (20) days

after EPA approval of the Treatability Testing Statement of Work, Respondent shall submit a Treatability Testing Work Plan, including a schedule for specified tasks.

4. Treatability Study Sampling and Analysis Plan. Within twenty (20) days after Respondent's receipt of a written determination by EPA, or upon a determination by Respondent, that there is a need for a separate or revised QAPP or FSP, Respondent shall submit a Treatability Study Sampling and Analysis Plan to EPA.

5. Treatability Study Health and Safety Plan. Simultaneously with the Treatability Study Sampling and Analysis Plan, if required, Respondent shall submit a Treatability Study Health and Safety Plan for the Site to EPA.

6. Treatability Study Evaluation Report. Within twenty (20) days after the completion of any treatability testing, Respondent shall submit a Treatability Study Evaluation Report as described in the SOW and RI/FS Work Plan.

G. Task VI: Development and Screening of Alternatives. Respondent shall develop an appropriate range of management options for the remediation of the hazardous substances, pollutants and contaminants at the Site which will be evaluated through the development and screening of alternatives, as provided in the SOW and RI/FS Work Plan. During the development and screening of alternatives, Respondent shall submit the following deliverables to EPA:

1. Memorandum on Remedial Action Objectives. Within twenty (20) days after Respondent's receipt of EPA's Risk Assessment and

Environmental Evaluation Reports, or upon completion of Site characterization, whichever is later, Respondent shall submit a Memorandum on Remedial Action Objectives.

2. Memorandum on Development and Preliminary Screening of Alternatives, Assembled Alternatives Screening Results and Final Screening. Within twenty (20) days after submittal of the Memorandum on Remedial Action Objectives, Respondent shall submit a memorandum summarizing the development and screening of remedial alternatives, including an alternatives array document as described in the SOW.

H. Task VII: Detailed Analysis of Alternatives. Respondent shall conduct a detailed analysis of remedial alternatives, as described in the SOW and the RI/FS Work Plan. During the detailed analysis of alternatives, Respondent shall submit the following deliverables to EPA:

1. Report on Comparative Analysis and Presentation to EPA. Within thirty (30) days after EPA approval of a memorandum on the development and screening of remedial alternatives, Respondent shall submit a Report on Comparative Analysis to EPA summarizing the results of the comparative analysis performed between the remedial alternatives. Within twenty (20) days after submitting the original Report on Comparative Analysis, Respondent shall make a presentation to EPA during which Respondent shall summarize the findings of the remedial investigation in relation to remedial action objectives, and present the results of the nine criteria evaluation and comparative analysis, as described

in the SOW.

2. Draft Feasibility Study Report. Within thirty (30) days after the presentation to EPA described in the preceding subparagraph, Respondent shall submit a draft Feasibility Study Report. Respondent shall refer to Table 6-5 of the RI/FS Guidance for the content and format of this report. The report as amended, and the administrative record, shall provide the basis for the EPA Proposed Plan pursuant to Sections 113(k) and 117(a) of CERCLA, 42 U.S.C. §§ 113(k), 117(a), and shall document the development and analysis of remedial alternatives.

25. EPA shall be the final arbiter in any dispute regarding the sufficiency or acceptability of all submittals, and of all activities performed pursuant to this Order, in accordance with the procedures for dispute resolution set forth in Section XVII of this Order.

26. Respondent shall not proceed further with subsequent activities or tasks until Respondent has received EPA approval for the RI/FS Work Plan and SAP. If treatability testing or studies are required, Respondent shall not proceed further with subsequent treatability testing or study activities or tasks until Respondent has received EPA approval for the Treatability Testing Work Plan and Sampling and Analysis Plan. Respondent shall proceed with all other tasks and activities in accordance with the schedule set forth in this Order and the SOW.

27. EPA may stop Respondent from proceeding at any time, either temporarily or permanently, on any task(s), activity(s) or

deliverable(s) at or relating to the Site and/or the implementation of this Order.

28. If Respondent modifies or revises any deliverable, report, plan, or other submittal after receipt of EPA comments, directions, or requirements, and EPA subsequently disapproves the revised submittal, or if subsequent submittals do not, in EPA's judgment, adequately address EPA's comments, directions or requirements for changes, EPA may seek stipulated or statutory penalties; perform its own studies; complete the RI/FS (or any portion of the RI/FS); and/or take any response action at the Site it deems necessary, in accordance with its authority, and seek reimbursement from Respondent for its costs therefor; and/or seek any other appropriate relief.

29. If EPA prohibits Respondent from performing some tasks, and/or takes over or causes others to perform some tasks, but does not remove Respondent's duty to prepare the RI/FS pursuant to this Order, Respondent shall incorporate and integrate information supplied by EPA into the final RI/FS report as directed by EPA.

30. The absence of express EPA comment, approval or disapproval of any submission within any specified time period shall not be construed as approval by EPA. Except as set forth in paragraphs 26 and 27 above, Respondent is responsible for the timely preparation of deliverables acceptable to EPA.

31. Respondent shall, prior to the shipment of hazardous substances from the Site to an out-of-state waste management facility, submit written notification, as set forth below, to the

appropriate state environmental official in the receiving state, and to the EPA Project Coordinator. This notification requirement shall not apply when the total volume of such a shipment will not exceed ten (10) cubic yards. Notification shall include: 1) the name and location of the receiving facility; (2) the type and quantity of hazardous substances to be shipped; (3) the expected shipment schedule; and (4) the mode of transportation. Respondent shall submit written notification of any changes in the shipment plan as set forth in the notification. Notification of the selection of the receiving facility and state shall be made at least thirty (30) days before any hazardous substances are actually shipped.

IX. MODIFICATION OF THE WORK PLAN

32. If at any time, Respondent identifies a need for additional data, Respondent shall submit a memorandum to the EPA Project Coordinator within twenty (20) days after such need has been identified explaining the need for, and the nature of the data sought, and the extension of time therefor. EPA will determine whether the additional data shall be incorporated into any deliverable(s).

33. In addition to the requirements of Section 103 of CERCLA, 42 U.S.C. § 9603, and all other statutory or regulatory reporting requirements, Respondent shall immediately notify EPA and IDHW of any conditions at the Site which may pose an immediate threat to human health or welfare or the environment. Respondent shall also

orally notify the EPA Project Coordinator within three (3) days of discovery of any unanticipated or changed circumstances at the Site. If, for any reason, the EPA Project Coordinator cannot be reached, Respondent shall as immediately as possible thereafter notify the EPA Region 10 Hazardous Waste Division Director, or leave detailed messages with both of their respective offices if neither can be reached. EPA may modify any work to be performed pursuant to this Order or require additional work in response to any change in circumstances. Respondent shall perform such modified or additional work.

34. EPA may determine at any time that additional work may be necessary to accomplish the objectives of the RI/FS as set forth in the SOW. EPA may require Respondent to perform such additional work or other response activity in addition to the work initially approved or modified. Respondent shall confirm its willingness to perform any such additional work in writing within seven (7) days after receipt of the EPA request therefor, or properly invoke the dispute resolution procedures set forth in Section XVII of this Order. Subject to the resolution of any dispute, Respondent shall implement the additional tasks EPA determines are necessary. The additional work shall be completed according to the written standards, specifications, and schedule set forth or approved by EPA. EPA may conduct all or part of such work itself, and may seek reimbursement of costs from Respondent, and/or any other appropriate relief.

X. QUALITY ASSURANCE

35. Respondent shall assure that all work performed, samples taken and analyses conducted, conform to the requirements of the SOW, the QAPP, and guidances identified therein, and that all field personnel shall be properly trained for each task they may perform, including strict adherence to EPA chain of custody procedures.

XI. FINAL RI/FS, PROPOSED PLAN, PUBLIC COMMENT, RECORD OF DECISION, ADMINISTRATIVE RECORD.

36. EPA retains full authority and responsibility for all aspects of public participation including the release to the public of the RI/FS Report, the preparation and release to the public of the Proposed Plan and the ROD, as set forth in CERCLA and the NCP.

37. EPA shall provide Respondent with the Final RI/FS Report, the Proposed Plan, and the ROD.

38. EPA will determine the contents of the administrative record file for the selection of remedial action. Respondent shall submit documents developed during the course of the RI/FS to EPA upon which response selection may be based. Upon request by EPA, Respondent shall submit copies of plans, task memoranda, including all documentation of field modifications, recommendations for further action, quality assurance memoranda and audits, raw data, field notes, laboratory analytical reports, and other reports to EPA. Respondent shall also submit any previous studies conducted under state, local or other federal authorities relating to response selection, and all communications between Respondent and

state, local or other federal authorities concerning response selection. EPA shall establish a community information repository at or near the Site to house a copy of the administrative record.

XII. PROGRESS REPORTS AND MEETINGS

39. Respondent shall make presentations at, and participate in, meetings and telephone conferences at the request of EPA during the initiation, conduct, and completion of the RI/FS. In addition to discussion of the technical aspects of the RI/FS, topics will include anticipated problems or new issues. Meetings and telephone conferences will be scheduled by EPA.

40. In addition to the deliverables set forth in this Order, until the termination of this Order, Respondent shall provide monthly progress reports to EPA by the 10th day of each month following the effective date of this Order, which: (1) describe the actions which have been taken to comply with this Order during the previous month; (2) include all results of sampling and tests and all other data received by the Respondent which has not been previously given to EPA; (3) describe all work planned for the next two (2) months with schedules relating such work to the overall project schedule, including percentage of completion data; and (4) describe all problems encountered and any anticipated problems, any actual or anticipated delays, and all solutions developed and implemented or planned to address any actual or anticipated problems or delays.

XIII. SAMPLING. ACCESS. AND DATA AVAILABILITY/ADMISSIBILITY

41. Within seven (7) days after Respondent's receipt of a written request by EPA, Respondent shall submit all results of sampling, tests, modeling or other data that are within the scope of the RI/FS and which are generated by Respondent, or on Respondent's behalf, including all raw data and all laboratory analytical reports generated by Respondent, or on Respondent's behalf, during implementation of this Order. All other information or records created, maintained or received by Respondent or its agents, employees, accountants, contractors or consultants which is in any way related to the implementation of this Order, including: contractual documents, invoices, receipts, work orders, disposal records, and any other records or documents not previously required herein shall promptly be made available to EPA on request as soon as practicable, but in any event within thirty (30) days of Respondent's receipt of EPA's request. EPA shall be permitted to copy all such documents. Respondent's obligation to produce documents under this paragraph shall exclude those portions of documents which are privileged from discovery as attorney-client privileged communications, or as attorney work product as defined in Federal Rule of Civil Procedure 26. For any document or portion thereof sought to be withheld hereunder, Respondent shall identify in writing the subject, author, addressee, and date, as well as any other information necessary to determine the basis of Respondent's claim of privilege or of attorney work product.

42. Respondent shall notify EPA at least seven (7) days prior

to conducting any field events described in the SOW, RI/FS Work Plan, or SAP. Upon request by EPA, or its authorized representative, Respondent shall allow split or duplicate samples to be taken by EPA or its authorized representatives of any material sampled in connection with the implementation of this Order. All of Respondent's split samples shall be analyzed by the methods identified in the QAPP.

43. EPA and its designated representatives shall be permitted to observe any work carried out pursuant to this Order. Respondent shall permit such designated representatives full access to, and freedom of movement at the Site and any other premises where work under this Order is to be performed, at all times, including, but not limited to, any time that work under this Order is being performed, for purposes of inspecting or observing Respondent's progress in implementing the requirements of this Order, verifying information submitted to EPA by Respondent, conducting investigations relating to contamination at the Site, or for any purpose EPA determines to be within its statutory and/or regulatory function, including video or audio recording of any activities at the Site. Nothing herein shall be interpreted as limiting or affecting EPA's right of entry or inspection authority under federal law. All persons with access to the Site under this paragraph shall comply with all approved health and safety plans.

44. Respondent may assert a claim of business confidentiality for part or all of the information submitted to EPA pursuant to this Order in accordance with Section 104(e)(7) of CERCLA, 42

U.S.C. § 9604(e)(7), and 40 C.F.R. Part 2, Subpart B. This claim shall be asserted in the manner described by 40 C.F.R. 2.203(b), and substantiated when made. If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA or IDHW without further notice to Respondent. Respondent shall not assert any confidentiality claim with respect to any data related to Site conditions, sampling, or monitoring.

45. Respondent shall not object to any use of any data gathered, generated, or evaluated by EPA, IDHW, or Respondent in the performance or oversight of any work which has been verified according to the quality assurance/quality control (QA/QC) procedures required by this Order or any EPA-approved work plan or SAP. If Respondent objects to any use of any other data relating to the RI/FS, Respondent shall submit a report to EPA which identifies and explains Respondent's objections, describes any proposed acceptable uses of the data, and specifically identifies any proposed limitations on the use of the data. This report must be submitted to EPA within fifteen (15) days after the monthly progress report containing the data.

46. Respondent shall timely obtain, in the form of a written access agreement(s), access to any portion of the Site, and to any off-Site premises where work under this Order is to be performed, which are owned by anyone other than Respondent, or any unit, division or subsidiary thereof. This Order does not convey any rights of access to Respondent. Such agreement(s) shall provide access for EPA, its contractors and oversight officials, IDHW and

its contractors, and Respondent and its authorized representatives, and shall specify that Respondent is not EPA's representative with respect to any liability associated with activities required by this Order. Copies of all such agreements shall be provided to EPA prior to the initiation of any field activities. Respondent shall, if necessary, provide reasonable compensation to any property owner for access. If Respondent is unable to obtain access to any premises necessary for any task or work required by this Order, under circumstances which constitute "force majeure" as defined in Section XIX of this Order, EPA may obtain access for Respondent, or perform tasks or activities under its own authority, or terminate this Order. If EPA performs any tasks or activities and does not terminate this Order, Respondent shall: perform all required work Respondent has the necessary access to perform; reimburse EPA for all costs EPA incurs in performing any tasks or activities; integrate the results of any tasks or activities undertaken by EPA into Respondent's deliverables; indemnify the United States for any liability arising out of the performance of any such tasks or activities by EPA to the extent set forth in paragraph 90 of this Order. Respondent shall reimburse EPA for all costs and attorney fees incurred by the United States to obtain access;

XIV. DESIGNATED PROJECT COORDINATORS

47. All notices and documents including reports, approvals, disapprovals, and other correspondence which must be submitted

under this Order, shall be sent by certified mail, return receipt requested, to the following addressees or to any other addressees which Respondent and EPA designate in writing:

A. Four (4) copies of documents to be submitted to EPA shall be forwarded to:

John Meyer, M/S HW-113,
U.S. EPA, Region 10
1200 Sixth Avenue
Seattle, WA 98101

B. One (1) copy of documents to be submitted to IDHW shall be forwarded to:

C. Documents to be sent to Respondent shall be forwarded to:

48. On or before the effective date of this Order, EPA and Respondent shall each designate their own Project Coordinator. Each Project Coordinator shall be responsible for overseeing the implementation of this Order. To the extent possible, communications between Respondent and EPA shall be directed to the Project Coordinators by mail, with copies to such other persons as EPA may designate.

49. Respondent's Project Coordinator shall be a qualified individual with experience in hazardous waste investigation and handling, and shall have the technical expertise and skills necessary to direct and supervise the activities required under to this Order. Twenty (20) days prior to commencement of any activities at the Site, Respondent shall submit the name, title,

qualifications, experience, professional affiliations, and background, of the individual selected as Respondent's Project Coordinator to EPA in writing.

50. EPA may disapprove Respondent's designated Project Coordinator which shall require Respondent to make another selection within ten (10) days of receipt of any such disapproval by EPA. Respondent may elect to change its Project Coordinator by submitting written notification to EPA at least ten (10) days before the effective date of such change, including all of the information required by paragraph 49 above for the designation of a Project Coordinator. EPA may change its Project Coordinator by sending a written notification of such change to Respondent at least ten (10) days before the effective date of such change. EPA's Project Coordinator shall have the authority lawfully vested in a Remedial Project Manager (RPM) and On-Scene Coordinator (OSC) by the NCP, and shall have the authority, in accordance with the requirements of the NCP, to halt any work required by this Order and to take any necessary response action when he or she determines conditions at the Site may present an imminent and substantial endangerment to the public health or welfare or the environment. The absence of the EPA Project Coordinator from the area under study pursuant to this Order shall not be cause for any stoppage or delay of any work.

51. EPA shall arrange for a qualified person to assist in its oversight and review of the conduct of the RI/FS, as required by Section 104(a) of CERCLA, 42 U.S.C. § 9604(a). The oversight

assistant may observe work and make inquiries in the absence of EPA, but is not authorized to modify any requirement of this Order or any requirement developed pursuant to this Order in any work plan or other document.

XV. OTHER APPLICABLE LAWS

52. All actions required to be taken pursuant to this Order shall be performed in accordance with the requirements of all applicable local, state, and federal laws and regulations. No local, state, or federal permit shall be required for any portion of any activity pursuant to this Order conducted entirely on-Site. Off-Site disposal of hazardous substances shall comply with all applicable provisions of CERCLA, the Resource Conservation and Recovery Act, ("RCRA") 42 U.S.C. §§ 6901-6992, the implementing regulations respectively thereunder, and EPA guidances and policies.

XVI. RECORD PRESERVATION

53. Notwithstanding any record retention policy to the contrary, all records and documents created by Respondent, or on Respondent's behalf, which relate in any way to the implementation of this Order, including all records referenced in paragraph 41 of this Order shall be preserved by Respondent for a minimum of six (6) years after commencement of construction of any remedial action at the Site. After this six (6) year period, Respondent shall notify EPA at least ninety (90) days before any records are scheduled to

be destroyed. If EPA requests that the documents be saved, Respondent shall, at no cost to EPA, give the documents or true and accurate copies of the documents, to EPA.

XVII. DISPUTE RESOLUTION

54. If a dispute arises concerning any document(s), work plan(s), or activity(s) or work to be performed by Respondent pursuant to this Order, Respondent shall notify EPA as promptly as possible but in no event later than ten (10) days after receipt of EPA disapproval or comment, or after Respondent has become aware, or should reasonably have become aware, of the dispute. Respondent's written notification shall set forth Respondent's position in the dispute, and state all bases therefor. If Respondent so notifies EPA, EPA and Respondent have an additional ten (10) days from EPA's receipt of Respondent's notification to resolve the dispute. If agreement is reached, the resolution shall be reduced to writing, signed by the parties and incorporated into this Order. If agreement is not reached within this ten (10) day period, EPA shall provide a written statement of its decision to Respondent. Respondent shall proceed in accordance with EPA's decision regarding the matter in dispute, regardless of whether Respondent agrees with the decision. If Respondent fails or refuses to fully implement EPA's decision, EPA may take any action it deems necessary, which is not inconsistent with this Order or its authority including implementation of its decision with recovery of its costs therefor from Respondent, enforcement of the

decision, collection of stipulated penalties, and/or any other appropriate relief.

55. Respondent is not relieved of its obligations to perform and conduct activities and submit deliverables in accordance with any schedules incorporated into or developed pursuant to this Order, while a matter is pending in dispute resolution. The invocation of dispute resolution does not stay stipulated penalties under this Order.

XVIII. STIPULATED PENALTIES

56. Respondent shall be liable for stipulated penalties, in accordance with this Section, for each day that Respondent fails to complete a designated deliverable in a timely manner, fails to produce a designated deliverable of acceptable quality to EPA, or otherwise fails to perform in accordance with the requirements of this Order. Penalties shall begin to accrue on the day after performance is due. EPA will provide written notice for violations that are not based on timeliness. Penalties shall continue to accrue through any period of required revision for any deliverable.

57. Payment shall be due within thirty (30) days after receipt of a demand letter from EPA. Respondents shall pay interest on any unpaid balance at the end of this thirty (30) day period, at the rate established by the Department of Treasury pursuant to 30 U.S.C. § 3717. Respondent shall further pay a handling charge of one (1) percent, to be assessed at the end of each thirty (30) day period, and a six (6) percent per annum penalty charge to be

assessed if any penalty is not paid in full within ninety (90) days after it is due.

58. Respondent shall make all payments by forwarding a check to:

U.S. Environmental Protection Agency
Region 10 Superfund Accounting
P.O. Box 371003M
Pittsburgh, Pennsylvania 15251

Checks should state the name of the Site, the Site identification number, the account number, and the title and docket number of this Order. A copy of the check and accompanying transmittal letter shall be forwarded to the EPA Project Coordinator.

59. For the following major deliverables, stipulated penalties shall accrue in the amount of $1,000 per day, per violation, for the first seven (7) days of noncompliance; $2,500 per day, per violation, for the eighth (8th) through fourteenth (14th) day of noncompliance; $5,000 per day, per violation, for the fifteenth (15th) day through the thirtieth (30th) day; and $10,000 per day, per violation, for the thirtieth (30th) day through the ninetieth (90th) day.

A. An original and any revised RI/FS Work Plan.

B. An original and any revised Sampling and Analysis Plan.

C. An original and any revised Remedial Investigation Report.

D. An original and any revised Treatability Testing Work Plan.

E. An original and any revised Treatability Study Sampling and Analysis Plan.

F. An original and any revised Feasibility Study Report.

60. For the following interim deliverables, stipulated penalties shall accrue in the amount of $500 per day, per violation, for the first seven (7) days of noncompliance; $1,000 per day, per violation, for the eighth (8th) through fourteenth (14th) day of noncompliance; $2,500 per day, per violation, for the fifteenth (15th) day through the thirtieth (30th) day; and $5,000 per day, per violation, for the thirtieth (30th) day through the ninetieth (90th) day.

A. Technical Memorandum on Modeling of Site Characteristics.

B. Preliminary Site Characterization Summary.

C. Identification of Candidate Technologies Memorandum.

D. Treatability Testing Statement of Work.

E. Treatability Study Evaluation Report.

F. Memorandum on Remedial Action Objectives.

G. Memoranda on Development and Preliminary Screening of Alternatives, Assembled Alternatives Screening Results, and Final Screening.

H. Comparative Analysis Report.

61. For the monthly progress reports, and for any failure to perform in accordance with the requirements of this Order, stipulated penalties shall accrue in the amount of $250 per day, per violation, for the first seven (7) days of noncompliance; $500 per day, per violation, for the eighth (8th) through fourteenth (14th) day of noncompliance; $2,000 per day, per violation, for the fifteenth (15th) day through the thirtieth (30th) day; and $5,000 per day, per violation, for the thirtieth (30th) day through the

ninetieth (90th) day.

62. Penalties shall accrue but need not be paid during a properly invoked dispute resolution period. If Respondent does not prevail upon resolution, all penalties shall be due within thirty (30) days after resolution of any such dispute.

63. If EPA decides corrections to any deliverable shall be reflected in any subsequent deliverable and does not require resubmission of the initial deliverable, stipulated penalties for the initial deliverable shall cease to accrue on the day of such decision by EPA.

64. The stipulated penalties provisions of this Order do not preclude EPA from pursuing any other remedies or sanctions, including any applicable statutory penalties. Payment of stipulated penalties does not alter Respondent's obligation to complete performance under this Order.

XIX. FORCE MAJEURE

65. "Force majeure", for purposes of this Order, is defined as any event arising from causes entirely beyond the control of Respondent or any entity controlled by Respondent, including Respondent's agents, consultants, contractors and subcontractors, which delays the timely performance of any obligation under this Order notwithstanding Respondent's best efforts to avoid such delay. The requirement that Respondent use "best efforts" shall include using best efforts to anticipate potential force majeure events and using best efforts to address the effects of any such

events as they may occur, and thereafter, such that the delay is minimized to the greatest extent practicable. Examples of events that are not force majeure events include increased costs or expenses of any work to be performed under this Order, or any financial inability or difficulty to perform any such work.

66. If any event occurs or has occurred which may delay the performance of any obligation under this Order, regardless of whether caused by a force majeure event, Respondent shall verbally notify the EPA Project Coordinator, as set forth in paragraph 33 above, as soon as possible, and not later than forty-eight (48) hours after Respondent knew or should have known that any event might cause a delay. Within seven (7) thereafter, Respondent shall provide a written memorandum explaining the reasons for the delay including; its anticipated duration; all actions taken or to be taken to prevent or minimize the delay; a schedule for the implementation of any measures to be taken to mitigate its effects; a statement as to whether Respondent believes the event may cause or contribute to an endangerment to public health, welfare or the environment; and, if applicable, why Respondent believes the event constitutes a force majeure. The memorandum shall be accompanied by all available pertinent documentation including any relevant third party correspondence. Respondent shall exercise best efforts to avoid or minimize any delay and any effects of any delay. Failure to comply with the above requirements shall preclude Respondent from asserting any claim of force majeure.

67. If EPA agrees that the delay or anticipated delay is

attributable to force majeure, the time for performance of the obligations under this Order that are directly affected by the force majeure event shall be extended by EPA for a period not to exceed the actual duration of the delay attributed to the force majeure event. An extension of the time for performance of the obligation directly affected by the force majeure event shall not extend the time for performance of any other obligations.

68. If EPA does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, or does not agree with Respondent as to the appropriate length of any extension due to force majeure, Respondent may invoke the dispute resolution procedures set forth in Section XVII of this Order.

69. In dispute resolution, Respondent shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure event, that the duration of the delay was or will be warranted under the circumstances, that Respondent did exercise or is exercising due diligence by using its best efforts to avoid and mitigate the effects of the delay, and that Respondent has complied with all of the requirements of paragraph 66 above.

XX. REIMBURSEMENT OF PAST COSTS

70. Within fifteen (15) days of the effective date of this Order, Respondent shall remit a certified or cashiers check to EPA in the amount of $60,049.20, for all response costs, plus interest, incurred by the United States in its investigation of the Site up

to and including September 8, 1990.

71. Checks should be made payable to the Hazardous Substances Superfund and should state the name of the Site, Site identification number, the Regional Lock Box Number account number as set forth below, and the title and docket number of this Order. Checks should be forwarded to:

U.S. Environmental Protection Agency
Superfund Accounting
P.O. Box 371003M
Pittsburgh, Pennsylvania 15251

72. A copy of the check and any transmittal correspondence should be sent simultaneously to the EPA Project Coordinator.

XXI. REIMBURSEMENT OF RESPONSE AND OVERSIGHT COSTS

73. Following the issuance of this Order, EPA shall submit an accounting of all response costs, including oversight costs incurred by the United States with respect to the Site, to Respondent on a periodic basis. Response costs may include but are not limited to, costs incurred by the United States in overseeing Respondent's implementation of the requirements of this Order, and activities performed by the United States as part of the RI/FS and community relations, including any costs incurred to obtain access. Costs shall include all direct and indirect costs, including but not limited to, time and travel costs of EPA personnel and associated indirect costs, contractor costs, cooperative agreement costs, compliance monitoring, including the collection and analysis of split samples, inspection of RI/FS activities, Site visits,

discussions regarding disputes that may arise regarding this Order, review and approval or disapproval of submissions, and costs of doing or redoing any of Respondent's tasks. Summaries, including EPA's certified Agency Financial Management System summary data (SPUR Reports), or such other summary as certified by EPA, may serve as a basis for payment demands by EPA.

74. Respondent shall within thirty (30) days of receipt of each accounting, remit a certified or cashier's check for the amount of costs requested by EPA. Interest shall accrue from the later of: the date payment of a specified amount is demanded in writing; or the date of the expenditure. The rate shall be the rate of interest on investments for the Hazardous Substances Superfund in Section 107(a) of CERCLA, 42 U.S.C. § 9607(a).

75. Checks should be made payable to the Hazardous Substances Superfund and should state the name of the Site, the Site identification number, the account number, and the title and docket number of this Order. Checks should be forwarded to:

U.S. Environmental Protection Agency
Superfund Accounting
P.O. Box 371003M
Pittsburgh, Pennsylvania 15251

76. Copies of the transmittal letter and check should be sent simultaneously to the EPA Project Coordinator.

77. Disputes concerning costs shall be limited to accounting errors and the inclusion of costs outside the scope of this Order. Respondent shall identify any contested costs and the basis of its objection in writing. All undisputed costs shall be remitted by Respondent in accordance with the schedule set forth above.

Disputed costs shall be paid into an escrow account by Respondent while any such dispute is pending. Respondent shall have the burden of establishing an EPA accounting error or the inclusion of any cost outside the scope of this Order. Interest shall accrue during any cost dispute.

XXII. RESERVATIONS OF RIGHTS AND REIMBURSEMENT OF OTHER COSTS

78. EPA reserves the right to bring an action against Respondent under Section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of all response costs which are not reimbursed by Respondent, including all past costs, all oversight costs and any future costs, incurred by the United States in connection with the implementation of this Order and/or any response activities at the Site.

79. EPA reserves the right to bring an action against Respondent, and/or any other responsible party, to enforce any provision or requirement of this Order or any requirement developed pursuant to this Order, including,but not limited to, all cost reimbursement requirements, the collection of stipulated penalties pursuant to Section XVIII of this Order, and the imposition of statutory penalties pursuant to Section 109 of CERCLA, 42 U.S.C. § 9609.

80. Except as expressly provided in this Order, each party reserves all rights and defenses it may have. Nothing in this Order shall affect EPA's removal, response, enforcement or other statutory and/or regulatory authority including its right to seek injunctive relief, perform response activities, recover stipulated

and/or statutory penalties, and/or punitive damages.

81. Following satisfaction of this Order, Respondent shall have no liability to EPA for the work Respondent has performed pursuant to this Order. Respondent is not released from any liability for any unauthorized activities or response actions taken beyond the scope of this Order, including any unauthorized emergency action or removal activity, any remedial design/remedial action, or any activities pursuant to Section 121(c) of CERCLA, 42 U.S.C. § 9621(c).

XXIII. DISCLAIMER

82. Except in any judicial or administrative proceeding by EPA or the United States to enforce this Order or any judgment relating to it, the Findings of Fact and Conclusions of Law set forth herein shall not be construed as any admission of liability by Respondent, and shall not be admissible in evidence against Respondent. Respondent retains the right to assert any statutory and/or common law claims it may have against any party other than EPA and the United States. Respondent shall not contest the validity or terms of this Order, or the procedures underlying or relating to it in any action brought by EPA or the United States pursuant to this Order.

XXIV. OTHER CLAIMS

83. Respondent shall not seek any reimbursement under Section 106(b) of CERCLA, 42 U.S.C. § 9606(b), and shall not present any

claims pursuant to Section 111 or 112 of CERCLA, 42 U.S.C. §§ 9611, 9612. This Order does not constitute any decision on preauthorization of funds under Section 111(a)(2) of CERCLA, 42 U.S.C. § 9611(a)(2). Respondent shall have no statutory or common law claims or counterclaims in law or equity against EPA relating to or arising out of conduct of the RI/FS and/or the implementation of this Order.

84. Nothing in this Order shall constitute or be construed as a release from any claim, cause of action or demand in law or equity against any person, firm, partnership, subsidiary or corporation not a signatory to this Order for any liability it may have arising out of or relating in any way to the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous substances, pollutants, or contaminants at, from, or taken to the Site.

85. Respondent shall not seek to recover any costs or attorneys fees from EPA or the United States.

XXV. FINANCIAL ASSURANCE, INSURANCE, AND INDEMNIFICATION

86. Respondent shall establish and maintain a financial instrument or trust account or other financial mechanism acceptable to EPA, which shall be funded sufficiently to perform the work and all other obligations of this Order, including a margin for cost overruns. Within fifteen (15) days after the effective date of this Order, Respondent shall fund the financial instrument or trust account in the total sum of FIVE HUNDRED THOUSAND DOLLARS

($500,00.00) for the period beginning with the effective date of the Order through the fourteenth (14th) day of the next quarter of the calender year. Beginning on the fifteenth (15th) day of said next quarter, and on or before the fifteenth (15th) day of each calendar year quarter thereafter, Respondent shall fund the financial instrument or trust account in an amount deemed sufficient by EPA to perform the work and all other activities required under this Order projected for the succeeding calendar year quarter.

87. If at any time the net worth of the financial instrument or trust account is insufficient to perform the work and other obligations of this Order for the upcoming quarter, Respondent shall provide written notice to EPA within seven (7) days after the net worth of the financial instrument or trust account becomes insufficient. The written notice shall describe why the financial instrument or trust account is insufficient, and what actions have been or will be taken to fund the financial instrument or trust account in accordance with the requirements of this Order.

88. A. Prior to the commencement of any work under this Order, Respondent shall secure, and shall maintain in force for the duration of this Order, and for two years after the completion of all activities required by this Order, Comprehensive General Liability ("CGL") and automobile insurance, with limits of five (5) million dollars, combined single limit, naming the United States as a co-insured. The CGL insurance shall include Contractual Liability Insurance in the amount of $500,000 per occurrence, and

Umbrella Liability Insurance in the amount of two (2) million per occurrence.

B. Respondent shall also secure, and maintain in force for the duration of this Order, and for two years after the completion of all activities required by this Order: Professional Errors and Omissions Insurance in the amount of $1,000,000.00 per occurrence, and Pollution Liability Insurance in the amount of $1,000,000.00 per occurrence, covering, as appropriate, both general liability and professional liability arising from pollution conditions.

C. For the duration of this Order, Respondent shall satisfy, or shall ensure that Respondent's contractors and subcontractors satisfy, all applicable laws and regulations regarding the provision of employer's liability insurance and workmen's compensation insurance for all persons performing work on behalf of Respondent, pursuant to this Order.

D. If Respondent demonstrates by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering the same risks but in a lesser amount, with respect to such contractor or subcontractor, Respondent need provide only that portion of the insurance described above which is not maintained by the contractor or subcontractor.

E. Prior to commencement of any work under this Order, and annually thereafter on the anniversary of the effective date of this Order, Respondent shall provide certificates of such insurance and a copy of each insurance policy to EPA.

89. At least seven (7) days prior to commencing any work under this Order, Respondent shall submit written certification to EPA that all the insurance required by paragraph 88 above, has been obtained as set forth therein.

90. Respondent shall indemnify and hold the United States, its agencies, departments, agents, and employees harmless from any and all claims or causes of action arising from or on account of acts or omissions of Respondent, its employees, agents, servants, contractors, subcontractors, consultants, laboratories, receivers, trustees, successors, or assigns, or any other persons or entities, in carrying out any activities pursuant to this Order. The United States or any agency or authorized representative thereof shall not be held as a party to any contract entered into by Respondent in carrying out any activities pursuant to this Order.

XXVI. EFFECTIVE DATE AND SUBSEQUENT AMENDMENT

91. The effective date of this Order shall be the date it is signed by EPA. Except when expressly stated otherwise herein, all time periods referred to in this Order shall be construed as calendar days, rather than "business" or "working" days. Any time period scheduled to begin on the occurrence of an act or event shall begin on the day after the act or event. If the final day of any time period falls on a Saturday, Sunday, or legal holiday ("non-final days"), the time period shall be extended to the next day which is not a non-final day.

92. In addition to the procedures set forth elsewhere in this

Order, this Order may be amended by agreement between EPA and Respondent. Amendments shall be in writing and shall be effective when signed by EPA. EPA Project Coordinators do not have the authority to sign any amendment to this Order.

93. No informal advice, guidance, suggestions, or comments by EPA regarding reports, plans, specifications, schedules, or any other writing submitted by Respondent will be construed as relieving Respondent of its obligation to obtain such formal approval as may be required by this Order. Any deliverables, plans, technical memoranda, reports (other than progress reports) specifications, schedules and attachments required by this Order or developed pursuant to this Order, are, upon approval by EPA, incorporated in, and made an enforceable part of, this Order by this reference.

XXVII. TERMINATION AND SATISFACTION

94. Except as set forth in this paragraph, this Order shall terminate when Respondent demonstrates in writing and certifies to the satisfaction of EPA that all activities required by this Order, including any additional work, payment of all costs, and any stipulated penalties demanded by EPA, have been performed, and EPA has approved the certification set forth in paragraph 95 below. Respondent's obligation to comply with Sections XVI (Record Preservation), XXI (Reimbursement of Response and Oversight Costs), and XXII (Reservations of Rights and Reimbursement of Other Costs), of this Order shall remain in full force and effect without time

or other limitation.

95. The following certification shall be signed by a responsible official on behalf of Respondent:

"In accordance with 28 U.S.C. § 1746, I certify under penalty of perjury under the laws of the United States that the information contained in and accompanying this certification is true, accurate, and complete. Dated this __ day of , 199_."

For purposes of this Order, a responsible official is a corporate official in charge of a principal business function.

IT IS SO ORDERED, this _____ day of _____, 1990.

UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY

By: _____
CHARLES E. FINDLEY, Director
Hazardous Waste Division
EPA Region 10

RESPONDENT hereby consents to the issuance of this ORDER, and agrees to abide by each and every provision herein, and to perform each and every task or requirement herein.

BY:_____DATE:_____
(NAME)
Title:
Monsanto Company

STATEMENT OF WORK FOR MONSANTO CHEMICAL COMPANY REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

INTRODUCTION

The purpose of this Remedial Investigation/Feasibility Study ("RI/FS") is to investigate the nature and extent of contamination at the Monsanto Chemical Company Soda Springs site ("Site"), the potential risk to human health and the environment, and develop and evaluate potential remedial alternatives. The RI and FS are interactive and may be conducted concurrently so that the data collected in the RI influences the development of remedial alternatives in the FS, which in turn affects the data needs and the scope of treatability studies.

Respondent will conduct this RI/FS and will produce draft RI and FS reports that are in accordance with this statement of work ("SOW"), the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (U.S. EPA, Office of Emergency and Remedial Response, October 1988), and any other guidances that EPA uses in conducting an RI/FS (a list of the primary guidances is attached), as well as any additional requirements in the Order. The RI/FS Guidance describes the report format and the required report content. The Respondent will furnish all necessary personnel, materials, and services needed, or incidental to, performing the RI/FS, except as otherwise specified in the Order.

At the completion of the RI/FS, EPA will be responsible for the selection of a Site remedy and will document this selection in a Record of Decision ("ROD"). The remedial action alternative selected by EPA will meet the cleanup standards specified in Section 121 of CERCLA, 42 U.S.C. § 9621; i.e., the selected remedial action will be protective of human health and the environment, will be in compliance with, or include a waiver of, applicable or relevant and appropriate requirements of other laws, will be cost effective, will utilize permanent solutions and alternative treatment technologies or resource recovery technologies, to the maximum extent practicable, and will address the statutory preference for treatment as a principal element. The final RI/FS report, as adopted by EPA, and the administrative record, will form the basis for the selection of the remedy for the Site, and will provide the information necessary to support the development of the ROD.

As specified in Section 104(a)(1) of CERCLA, 42 U.S.C. § 9604(a)(1), as amended, EPA will provide oversight of Respondent's activities throughout the RI/FS. Respondent will support EPA's initiation and conduct of activities related to the implementation of oversight activities.

TASK 1 - SCOPING (RI/FS Guidance, Chapter 2)

Scoping includes the initial planning process of the RI/FS and is initiated by EPA prior to issuing special notice. During the initial phases, Site-specific objectives of the RI/FS, and a general management approach for the Site are determined by EPA. Scoping is therefore initiated prior to negotiations between potentially responsible parties ("PRP"s) and EPA, and is continued, repeated as necessary, and refined throughout the RI/FS process. Consistent with the general management approach, the specific project scope will be planned by Respondent and EPA. Respondent will document the specific project scope in a work plan. Because the work required to perform an RI/FS is not fully known at the onset, and is phased in accordance with the a Site's complexity and the amount of available information, it may be necessary to modify the work plan during the RI/FS to satisfy the objectives of the study.

The objectives for the Site have been determined preliminarily, based on available information. They are to gather additional data of sufficient quantity and quality concerning contaminants in soil and groundwater to conduct a Human Health and Ecological Risk Assessment, to determine extent and transport of contaminants, and to select the most appropriate remedial action by conducting a Feasibility Study.

The strategy for the general management of the Site will include a sampling strategy to be agreed upon by EPA and Respondent which meets the above objectives based on the nature and extent of contamination at the Site. The data generated from the sampling effort will then be used to meet all of the requirements of an RI/FS which are outlined in this Statement of Work.

When scoping the specific aspects of a project, Respondent must meet with EPA to discuss all project planning decisions and special concerns associated with the Site. The following activities shall be performed by Respondent as a function of the project planning process.

a. <u>Site Background</u> (2.2)

Respondent will gather and analyze the existing Site background information to assist in planning the scope of the RI/FS.

<u>Collect and analyze existing data and document the need for additional data</u> (2.2.2; 2.2.6; 2.2.7)

Before planning RI/FS activities, all existing Site data will be thoroughly compiled and reviewed by Respondent, including all presently available data relating to the varieties and quantities of hazardous substances at the Site, and past

disposal practices. This will also include results from any previous sampling events which may have been conducted by Respondent or a third party. Respondent will refer to Table 2-1 of the RI/FS Guidance for a comprehensive list of data collection information sources. The available information will be utilized in determining additional data needed to finish characterizing the Site, better define potential applicable or relevant and appropriate requirements (ARARs), and to develop a range of preliminarily identified remedial alternatives Data Quality Objectives ("DQO"s) which will be established subject to EPA approval. The DQOs will be used to characterize the usefulness and completeness of existing data. Decisions on the DQOs and data needs will be made by EPA.

b. Project Planning (2.2)

Once Respondent has collected and analyzed existing data, the specific project scope will be determined. Project planning activities include those tasks described below as well as identifying data needs, developing any work plan, designing a data collection program, and identifying health and safety protocols. Respondent will meet with EPA regarding the following activities and before the drafting of the scoping deliverables identified in Section c below.

Refine and document preliminary remedial action objectives and alternatives (2.2.3)

Once existing Site information has been analyzed and a conceptual understanding of the potential Site risks is reached, Respondent will review and, if necessary, refine the remedial action objectives that have been identified by EPA for each contaminated medium. The revised remedial action objectives will be documented in a technical memorandum and subject to EPA approval. Respondent will then identify a preliminary range of broadly defined potential remedial action alternatives and associated technologies. The range of potential alternatives should encompass, where appropriate, alternatives in which treatment significantly reduces the toxicity, mobility, or volume of the waste; alternatives which involve containment with little or no treatment; and a no-action alternative.

Document the need for treatability studies (2.2.4)

If remedial actions involving treatment have been identified by Respondent or EPA, treatability studies will be required unless Respondent can demonstrate to EPA's satisfaction that they are not needed. If treatability studies are needed, initial treatability testing activities (such as research and study design) will be planned to occur concurrently with Site

characterization activities (see Tasks 3 and 5).

Begin preliminary identification of Potential ARARs (2.2.5)

Respondent will conduct a preliminary identification of potential state and federal ARARs (chemical-specific, location-specific and action-specific) to assist in the refinement of remedial action objectives, and the initial identification of remedial alternatives and ARARs associated with particular actions. ARAR identification will continue as Site conditions, contaminants, and remedial action alternatives are better defined.

c. Scoping Deliverables (2.3)

After the project planning phase, Respondent will submit a RI/FS work plan, a sampling and analysis plan, ("SAP") and a site health and safety plan. The RI/FS work plan and SAP must be reviewed and approved by EPA prior to the initiation of any field activities.

RI/FS Work Plan (2.3.1)

A work plan documenting the decisions and evaluations completed during the scoping process will be submitted to EPA for review and approval. The work plan should be developed in conjunction with the SAP and the site health and safety plan, although each plan may be delivered under separate cover. The work plan will include: a comprehensive description of the work to be performed, including the methodologies to be utilized; a corresponding schedule for completion, and the rationale for performing all required activities.

Specifically, the work plan will present a statement of the remaining problem(s) and potential problem(s) posed by the Site, and the objectives of the RI/FS. It will include a Site background summary setting forth the Site description including its geographic location, and to the extent possible, a description of its physiography, hydrology, geology, demographics, ecological, cultural and natural resource features; a synopsis of its history and a description of previous responses that have been conducted at the Site by local, state, federal, or private parties; a summary of the existing data in terms of physical and chemical characteristics of the contaminants identified, and their distribution among the environmental media at the Site. Previous studies and information on the Site already submitted to EPA may be incorporated by reference. The plan will also include: a conceptual "model" describing the contaminant sources, and potential migration and exposure pathways and receptors; a description of the Site management strategy

developed by EPA during scoping; a preliminary identification of remedial alternatives and data needs for evaluation of remedial alternatives. It shall also reflect coordination with treatability study requirements (see Tasks 1 and 5); and include a process for and manner of identifying Federal and state ARARs (chemical-specific, location-specific and action-specific).

The major part of the work plan is a detailed description of the tasks to be performed, information needed for each task, information to be produced during and at the conclusion of each task, and a description of the work products that will be submitted to EPA. This includes the deliverables set forth in the remainder of this SOW; a schedule for each of the required activities which is consistent with the RI/FS guidance; and a project management plan, including a data management plan (e.g., requirements for project management systems and software, minimum data requirements, data format and backup data management), monthly reports to EPA and meetings and presentations to EPA at the conclusion of each major phase of the RI/FS. Respondent will refer to Appendix B of the RI/FS Guidance for a more comprehensive description of the contents of the required work plan.

Because of the iterative nature of the RI/FS, additional data requirements and analyses may be identified throughout the process. Respondent will submit a technical memorandum documenting the need for additional data, and identifying the DQOs whenever such requirements are identified. In any event, Respondent is responsible for fulfilling additional data and analysis needs identified by EPA consistent with the general scope and objectives of this RI/FS.

Sampling and Analysis Plan (2.3.2)

Respondent will prepare a sampling and analysis plan ("SAP") to ensure that sample collection and analytical activities are conducted in accordance with technically acceptable protocols, and that the data meet DQOs. The SAP provides a mechanism for planning field activities and consists of a field sampling plan ("FSP") and a quality assurance project plan ("QAPP").

The FSP will define in detail the sampling and data-gathering methods to be used on the project. It will include sampling objectives, sample location and frequency, sampling equipment and procedures, and sample handling and analysis. The QAPP will describe the project objectives and organization, functional activities, and quality assurance and quality control ("QA/QC") protocols to be used to achieve the desired DQOs. The DQOs will, at a minimum, reflect use of analytic methods for identifying contamination and remediating contamination consistent with the levels for remedial action

objectives identified in National Oil and Hazardous Substances Pollution Contingency Plan ("NCP") at 40 CFR Part 300, (March 8, 1990).

The QAPP will address sampling procedures, sample custody, analytical procedures, and data reduction, validation, reporting and personnel qualifications. Field personnel should be available for EPA QA/QC training and orientation where applicable. Respondent will demonstrate in the QAPP that each laboratory it may use is qualified to conduct the proposed work including: use of methods and analytical protocols for the chemicals of concern in the media of interest within detection and quantification limits consistent with both QA/QC procedures and DQOs approved in the QAPP for the Site by EPA. Each laboratory must have, and follow, an approved QA program. If a laboratory not in the Contract Laboratory Program (CLP) is selected, methods consistent with CLP methods must be used. If the laboratory is not in the CLP program, a laboratory QA program must be submitted for EPA review and approval. EPA may require Respondent to submit detailed information to demonstrate that the laboratory is qualified to conduct the work, including information on personnel qualifications, equipment and material specifications. Respondent will provide assurances that EPA has access to laboratory personnel, equipment and records for sample collection, transportation and analysis.

Site Health and Safety Plan (2.3.3)

A health and safety plan will be prepared in conformance with the Respondent's health and safety program, and in compliance with OSHA regulations and protocols. It will include the elements described in the RI/FS Guidance, such as a health and safety risk analysis, a description of monitoring and personal protective equipment, medical monitoring, and Site control. EPA does not "approve" Respondent's health and safety plan. EPA reviews it to ensure all necessary elements are included, and that it provides for the protection of human health and the environment.

TASK 2 - COMMUNITY RELATIONS

The development and implementation of community relations activities are responsibilities of EPA. The critical community relations planning steps performed by EPA include conducting community interviews and developing a community relations plan. Although EPA implements the community relations plan, Respondent may assist by providing information regarding the Site's history, participating in public meetings, or by preparing fact sheets for distribution to the public. EPA shall establish a community information repository, at or near the site, to house a copy of the administrative record. The extent of Respondent's involvement

in community relations activities shall be within the sole discretion of EPA.

TASK 3 - SITE CHARACTERIZATION (RI/FS Guidance, Chapter 3)

As part of the RI, Respondent will perform the activities described in this task, including the preparation of a Site characterization summary and a RI report. The overall objective of Site characterization is to describe areas of the Site which may still pose a threat to human health or the environment. This is accomplished by determining the Site's physiography, geology, and hydrology, defining the surface and subsurface pathways of contaminant migration, identifying any remaining sources of contamination and defining the nature, extent, and volume of these sources, including their physical and chemical constituents as well as their concentrations at incremental locations to background in the affected media. Respondent will also investigate the extent of migration of this contamination and its volume and any changes in its physical or chemical characteristics, to provide for a comprehensive understanding of the nature and extent of contamination at the Site. Contaminant fate and transport shall be determined and projected from this information.

During this phase of the RI/FS, the work plan, SAP, and health and safety plan are implemented. Field data are collected and analyzed to provide the information required to accomplish the objectives of the study. After the above plans have been approved by EPA, Respondent will notify EPA at least two (2) weeks in advance of any field activities, including field lay out of the sampling grid, excavation, installation of wells, initiating sampling, installation and calibration of equipment, pump tests, and initiation of analysis and all other field investigation activities. To satisfy the objectives of the RI/FS, Respondent may have to supplement the work specified in the initial work plan. Respondent will provide a monthly progress report and participate in meetings at major points in the RI/FS, as requested by EPA.

a. Field Investigation (3.2)

The field investigation includes the gathering of any additional data needed to finish defining Site physical characteristics, any remaining sources of contamination, and the nature and extent of contamination at the Site. These activities will be performed by Respondent in accordance with the work plan and SAP. At a minimum, this shall address the following:

Implement and document field support activities (3.2.1)

Respondent will initiate field support activities following approval of the work plan and SAP. Field support activities may include obtaining access to the Site, scheduling, and procuring equipment, office space, laboratory services, and/or

contractors. Respondent will notify EPA at least two (2) weeks prior to initiating field support activities so EPA may adequately schedule oversight tasks. Respondent will also notify EPA in writing upon completion of field support activities.

Investigate and define site physical characteristics (3.2.2)

Respondent will collect data on the physical characteristics of the Site and its surrounding areas including the physiography, geology, and hydrology, and specific physical characteristics identified in the work plan. This information will be ascertained through a combination of physical measurements, observations, and sampling efforts and will be utilized to define potential transport pathways and receptor populations. In defining the Site's physical characteristics Respondent will also obtain sufficient engineering data (such as pumping characteristics) for the projection of contaminant fate and transport, and development and screening of remedial action alternatives, including information to assess treatment technologies. Again, previous studies and information already submitted to EPA may be incorporated by reference.

Define sources of contamination (3.2.3)

Respondent will locate each remaining source of contamination. For each location, the areal extent and depth of contamination will be determined by sampling at incremental depths on a sampling grid. Respondent shall conduct sufficient sampling to define the boundaries of these remaining contaminant sources to the level established in the QA/QC plan and DQOs. Defining the remaining source of contamination will include analyzing the potential for contaminant release (e.g., long term leaching from soil), contaminant mobility and persistence, and characteristics important for evaluating remedial actions, including information to assess treatment technologies.

Describe the nature and extent of contamination (3.2.4)

Respondent will gather any additional information necessary to finish describing the nature and extent of contamination as a final step during the field investigation. Respondent will utilize the information on Site physical characteristics and sources of contamination to give a preliminary estimate of the contaminants that may have migrated. Respondent will then implement an iterative monitoring program and any study program identified in the work plan or SAP, and by using analytical techniques sufficient to detect and quantify the concentration of contaminants, shall determine the migration of contaminants through the various media at the Site. Respondent will also gather data for calculations of

contaminant fate and transport. This process is continued until the area and depth of contamination are known to the level of contamination established in the QA/QC plan and DQOs. Information on the nature and extent of contamination will be utilized to determine the level of risk presented by the Site, and will help to determine aspects of any additional appropriate remedial action alternatives to be evaluated.

b. Data Analyses (3.4)

Evaluate site characteristics (3.4.1)

Respondent will analyze and evaluate the data generated during previous studies and during the Site investigation to describe: (1) Site physical characteristics, (2) any remaining contaminant source characteristics, (3) nature and extent of contamination, and (4) contaminant fate and transport. Results of the Site physical characteristics, source characteristics, and extent of contamination analyses are utilized in the analysis of contaminant fate and transport. The evaluation will include the actual and potential magnitude of releases from the sources, and horizontal and vertical spread of contamination as well as mobility and persistence of contaminants. If modeling is appropriate, such models shall be identified to EPA in a technical memorandum prior to their use. All data and programming, including any proprietary programs, shall be made available to EPA together with a sensitivity analysis in the Preliminary Site Characterization Summary. This evaluation shall provide any information relevant to Site characteristics necessary for evaluation of the need for remedial action, and for the development and evaluation of remedial alternatives. Analyses of data collected for Site characterization will meet the DQOs developed in the QA/QC plan stated in the SAP (or revised during the RI).

c. Data Management Procedures (3.5)

Respondent will consistently document the quality and validity of field and laboratory data compiled during the RI. All groundwater data supplied to EPA must be in strict adherence with the Region 10 Groundwater Data Management Order, R10 7500.1, dated August 15, 1989, a copy of which is attached to this SOW as Attachment 1.

Document field activities (3.5.1)

Information gathered during Site characterization will be consistently documented and adequately recorded by Respondent in well maintained field logs and laboratory reports. The method(s) of documentation must be specified in the work plan and/or the SAP. Field logs must be utilized to document

observations, measurements, and significant events that have occurred during field activities. Laboratory reports must document sample custody, analytical responsibility, analytical results, adherence to prescribed protocols, nonconformity events, corrective measures, and/or data deficiencies.

Maintain sample management and tracking (3.5.2; 3.5.3)

Respondent will maintain field reports, sample shipment records, analytical results, and QA/QC reports to ensure that only validated analytical data are reported and utilized in the development and evaluation of remedial alternatives. Analytical results developed under the work plan will not be included in any Site characterization reports unless accompanied by, or cross-referenced to, a corresponding QA/QC report. Respondent will establish a data security system to safeguard chain-of-custody forms and other project records to prevent loss, damage, or alteration of project documentation.

d. Site Characterization Deliverables (3.7)

Respondent will prepare the preliminary Site characterization summary and, once the baseline risk assessment (Task 4) has been completed by EPA, the remedial investigation report.

Preliminary Site Characterization Summary (3.7.2)

After completing field sampling and analysis, Respondent will prepare a concise Site characterization summary which will review all investigative activities; describe and display Site data documenting the location and characteristics of surface and subsurface features and contamination at the Site, including the affected medium location, types, physical state, concentration and quantity of contaminants. In addition, the location, dimensions, physical condition and varying concentrations of each contaminant throughout each source and the extent of contaminant migration through each of the affected media will be documented. The Site characterization summary will provide EPA with a preliminary reference for developing the risk assessment, and evaluating the development and screening of remedial alternatives and the refinement and identification of ARARs.

Remedial Investigation (RI) Report (3.7.3)

Respondent will prepare and submit a draft RI report to EPA for review and approval after completion of the baseline risk assessment by EPA (see Task 4). This report shall summarize results of field activities to characterize the Site, remaining sources of contamination, nature and extent of contamination, the fate and transport of contaminants, and results of the baseline risk assessment. Respondent will

refer to the RI/FS Guidance for an outline of the report format and contents. Following comment by EPA, Respondent will prepare a final RI report which satisfactorily addresses all EPA comments.

TASK 4 - BASELINE RISK ASSESSMENT (3.4.2)

As set forth in the Order, EPA will perform a Baseline Risk Assessment which will identify and characterize the toxicity and levels of hazardous substances, contaminant fate and transport, the potential for human and/or environmental exposure, and the risk of potential impacts or threats on human health and the environment. This assessment will provide bases and justification for necessary remedial activity. Respondent shall incorporate the Baseline Risk Assessment reports generated by EPA into the RI Report.

TASK 5 - TREATABILITY STUDIES (RI/FS Manual, Chapter 5)

Unless Respondent can demonstrate to EPA satisfaction that they are not needed, treatability testing will be performed by Respondent to assist in the detailed analysis of alternatives. If applicable, testing results and operating conditions will be used in the detailed design of the selected remedial technology. Treatability testing includes the following activities:

a. Determination of Candidate Technologies and of the Need for Testing (5.2; 5.4)

Respondent will identify in a technical memorandum, subject to EPA review and approval, candidate technologies for a treatability studies program during project planning (Task 1). Candidate technologies will cover the range of technologies required for alternatives analysis (Task 6 a). The specific data requirements for the testing program will be determined and refined during Site characterization and the development and screening of remedial alternatives (Tasks 2 and 6, respectively).

Conduct literature survey and determine the need for treatability testing (5.2)

Respondent will conduct a literature survey to gather information on performance, relative costs, applicability, removal efficiencies, operation and maintenance (O&M) requirements, and implementability of candidate technologies. If practical candidate technologies have not been sufficiently demonstrated, or cannot be adequately evaluated for the Site on the basis of available information, treatability testing will be conducted. If EPA determines treatability testing is required, and unless the Respondent can demonstrate to EPA's satisfaction that they are not needed, Respondent will submit a statement of work to EPA outlining the steps and data

necessary to evaluate and initiate the treatability testing program.

Evaluate treatability studies (5.4)

Once a decision has been made to perform treatability studies, Respondent and EPA will decide on the type of treatability testing to use (e.g., bench versus pilot). Because of the time required to design, fabricate, and install pilot scale equipment as well as perform testing for various operating conditions, the decision to perform pilot testing should be made as early in the process as possible to minimize potential delays of the FS. To assure that a treatability testing program is completed on time, and with accurate results, Respondent will either submit a separate treatability testing work plan or an amendment to the original Site work plan for EPA review and approval.

b. Treatability testing and deliverables (5.5; 5.6; 5.8)

The required deliverables, in addition to the memorandum identifying candidate technologies, if treatability testing is conducted include: a work plan, a SAP, and a final treatability evaluation report. EPA may also require a treatability study health and safety plan, if appropriate.

Treatability testing work plan (5.5)

Respondent will prepare a treatability testing work plan or amendment to the original Site work plan for EPA review and approval describing the Site background, remedial technology(ies) to be tested, test objectives, experimental procedures, treatability conditions to be tested, measurements of performance, analytical methods, data management and analysis, health and safety, residual waste management, and DQO documentation. If pilot-scale treatability testing is to be performed, the pilot-scale work plan will describe pilot plant installation and start-up, pilot plant operation and maintenance procedures, operating conditions to be tested, a sampling plan to determine pilot plant performance, and a detailed health and safety plan. If testing is to be performed off-site, permitting requirements will be addressed.

Treatability study SAP (5.5)

If EPA determines that the original QAPP or FSP is not adequate for defining the activities to be performed during the treatability tests, a separate treatability study SAP or amendment to the original Site SAP will be prepared by Respondent for EPA review and approval. Task 1, item c., above, provides additional information on SAP requirements.

Treatability study health and safety plan (5.5)

If EPA determines that the original health and safety plan is not adequate for defining the activities to be performed during the treatability tests, a separate or amended health and safety plan will be developed by Respondent. Task 1, item c., above, provides additional information on health and safety plan requirements. EPA will review but will not "approve" the treatability study health and safety plan.

Treatability study evaluation report (5.6)

Following completion of treatability testing, Respondent will analyze and interpret the testing results in a technical report to EPA. Depending on the sequence of activities, this report may be a part of the RI/FS report or a separate deliverable. The report will evaluate each technology's effectiveness, implementability, cost and actual results as compared with predicted results. The report will also evaluate full-scale application of the technology, including a sensitivity analysis identifying the key parameters affecting full-scale operation.

TASK 6 - DEVELOPMENT AND SCREENING OF REMEDIAL ALTERNATIVES
(RI/FS Guidance, Chapter 4)

The development and screening of remedial alternatives is performed to develop an appropriate range of options to be evaluated. This range of alternatives should include as appropriate, options in which treatment is used to reduce the toxicity, mobility, or volume of hazardous substances or wastes, but varying in the types of treatment, the amount treated, and the manner in which long-term residuals or untreated hazardous substances or wastes are managed; options involving containment with little or no treatment; options involving both treatment and containment; and a no-action alternative. The following activities will be performed by Respondent as a function of the development and screening of remedial alternatives.

a. Development and Screening of Remedial Alternatives (4.2)

Concurrent with its RI Site characterization task, Respondent will begin to develop and evaluate a range of appropriate hazardous substance or waste management options which, at a minimum, ensure protection of human health and the environment.

Refine and document remedial action objectives (4.2.1)

Respondent will review, and if necessary, propose refinement to the Site-specific remedial action objectives that were established by EPA prior to negotiations between EPA and Respondent. The revised remedial action objectives will be

documented in a technical memorandum. These objectives will specify the contaminants and media of interest, exposure pathways and receptors, and an acceptable contaminant level or range of levels for each exposure route.

Develop general response actions (4.2.2)

Respondent will develop general response actions for each medium of interest defining containment, treatment, excavation, pumping, or other actions, singly or in combination, to satisfy the remedial action objectives.

Identify areas or volumes of media (4.2.3)

Respondent will identify areas or volumes of media to which general response actions may apply, taking into account the requirements for protectiveness identified in the remedial action objectives, and the chemical and physical characteristics of the Site.

Identify, screen, and document remedial technologies (4.2.4; 4.2.5)

Respondent will identify and evaluate technologies applicable to each general response action to eliminate those that cannot be implemented at the Site. General response actions will be refined to specify remedial technology types. Technology process options for each of the technology types will be identified either concurrent with, or immediately following the identification of technology types. Process options will be evaluated on the basis of effectiveness, implementability, and cost factors to select and retain one or, if necessary, more representative processes for each technology type. The technology types and process options will be summarized in a technical memorandum to be submitted to EPA for review and approval. The reasons for eliminating alternatives must be specified.

Assemble and document alternatives (4.2.6)

Respondent will assemble selected representative technologies into alternatives for each affected medium or operable unit. Together, all of the alternatives will represent a range of treatment and containment combinations that will address the Site as a whole. A summary of the assembled alternatives and their related action-specific ARARs will be included in a technical memorandum to be submitted to EPA for review and approval. The reasons for eliminating alternatives during the preliminary screening process must be specified.

Refine alternatives

Respondent will refine the remedial alternatives to identify contaminant volume addressed by each proposed process, and the sizing of critical unit operations, as necessary. Sufficient information will be collected for an adequate comparison of alternatives. Remedial action objectives for each medium will also be refined as necessary to incorporate any new risk assessment information being generated from the remedial investigation. Action-specific ARARs will be updated as remedial alternatives are refined.

Conduct and document screening evaluation of each alternative (4.3)

If necessary, Respondent will perform a final screening process based on short and long term aspects of effectiveness, implementability, and relative cost. Generally, this screening process is only necessary when there are many feasible alternatives available for detailed analysis. If required, the screening of alternatives will be conducted to assure that only the alternatives with the most favorable composite evaluation of all factors are retained for further analysis.

As appropriate, the screening will preserve the range of treatment and containment alternatives initially developed. The range of remaining alternatives will include options that use treatment technologies and permanent solutions to the maximum extent practicable. Respondent will prepare a technical memorandum summarizing the results and reasoning employed in screening, arraying alternatives that remain after screening, and identifying the action-specific ARARs for the remaining alternatives.

b. Alternatives Development and Screening Deliverables (4.5)

Respondent will prepare a technical memorandum summarizing the work performed and the results of each task above, including an alternatives array summary. These alternatives will be modified by Respondent if required by EPA to assure identification of a complete and appropriate range of viable alternatives for detailed analysis. This deliverable will document the methods, rationale, and results of the alternatives screening process.

TASK 7 - DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES
(RI/FS Guidance, Chapter 6)

A detailed analysis will be conducted by Respondent to provide EPA with sufficient information for the selection of a Site remedy. This analysis is Respondent's final FS task.

a. Detailed analysis of alternatives (6.2)

Respondent will conduct a detailed analysis of alternatives consisting of an analysis of each option against a set of nine (9) evaluation criteria, and a comparative analysis of all options using the same evaluation criteria.

Apply nine (9) criteria and document analysis (6.2.1 - 6.2.4)

Respondent will apply nine (9) evaluation criteria to the assembled remedial alternatives to ensure that the selected remedial alternative will be protective of human health and the environment; will be in compliance with, or include a waiver of, ARARs; will be cost-effective; will utilize permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable; and will address the statutory preference for treatment as a principal element. The evaluation criteria include: (1) overall protection of human health and the environment; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume; (5) short-term effectiveness; (6) implementability; (7) cost; (8) state (or support agency) acceptance; and (9) community acceptance. (Note: criteria 8 and 9 are considered after the RI/FS report has been released to the general public.) For each alternative, Respondent should provide: (1) a description of the alternative which outlines the hazardous substance or waste management strategy involved and identifies the key ARARs, and (2) a discussion of the individual criterion assessment. If Respondent does not have direct input on criteria 8 (state or support agency acceptance) and 9 (community acceptance), these will be addressed by EPA.

Compare alternatives against each other and document the comparison of alternatives (6.2.5; 6.2.6)

Respondent will perform a comparative analysis between the remedial alternatives comparing each alternative against the others using the evaluation criteria. EPA will identify and select the preferred alternative. Respondent will prepare a technical memorandum summarizing the results of the comparative analysis.

b. Detailed Analysis Deliverables (6.5)

In addition to the technical memorandum summarizing the results of the comparative analysis, Respondent will submit a draft FS report to EPA for review and approval. After all EPA comments have been addressed by Respondent to EPA satisfaction, the final FS report will be bound with the final RI report.

Feasibility study report (6.5)

Respondent will prepare a draft FS report for EPA review and comment. This report, as ultimately adopted or amended by EPA, provides a basis for remedy selection by EPA and documents the development and analysis of remedial alternatives. Respondent will refer to the RI/FS guidance for an outline of the report format and the required report content. Respondent will prepare a final FS report which satisfactorily addresses all EPA comments.

REFERENCES FOR CITATION

The following list, although not comprehensive, comprises many of the regulations and guidance documents that apply to the RI/FS process:

The NCP, as amended, 40 C.F.R. Part 300 (March 8, 1990)

"Guidance for Conducting Remedial investigations and Feasibility Studies under CERCLA," U.S. EPA, Office of Emergency and Remedial Response, October 1988, OSWER Directive No. 9355.3-01.

"Interim Guidance on Potentially Responsible Party Participation in remedial Investigation and Feasibility Studies," U.S. EPA, Office of Waste Programs Enforcement, Appendix A to OSWER directive No. 9355.3-01.

"Guidance on Oversight of Potentially responsible Party Remedial Investigations and Feasibility Studies," U.S. EPA, Office of Waste Programs Enforcement, (forthcoming), OSWER Directive No. 9835.3.

"A Compendium of Superfund Field operations Methods," two volumes, u.S. Epa, Office of Emergency and Remedial Response, EPA/540/p-87/001-A, August 1987, OSWER Directive No. 9355.0-14.

"EPA NEIC Policies and Procedures Manual," May 1978, revised November 1984, EPA-330/9-78-001-R.

"Data Quality Objectives for Remedial Response Activities," U.S. EPA, Office of Emergency and Remedial Response and Office of Waste Programs Enforcement, EPA/540/g-87/003, March 1987, OSWER Directive No. 9335.0-7B.

"Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. EPA, Office of Research and Development, Cincinnati, OH, QAMS-004/80, December 29, 1980.

"Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. EPA, Office of Emergency and Remedial Response, QAMS-005/80, December 1980.

"Users Guide to the EPA Contract Laboratory Program," U.S. EPA, Sample Management Office, August 1982.

"Interim Guidance on Compliance with Applicable Or Relevant And Appropriate Requirements," U.S. EPA, Office of Emergency and Remedial Response, July 9, 1987, OSWER Directive No. 9234.0-05.

ENVIRONMENTAL PROTECTION AGENCY

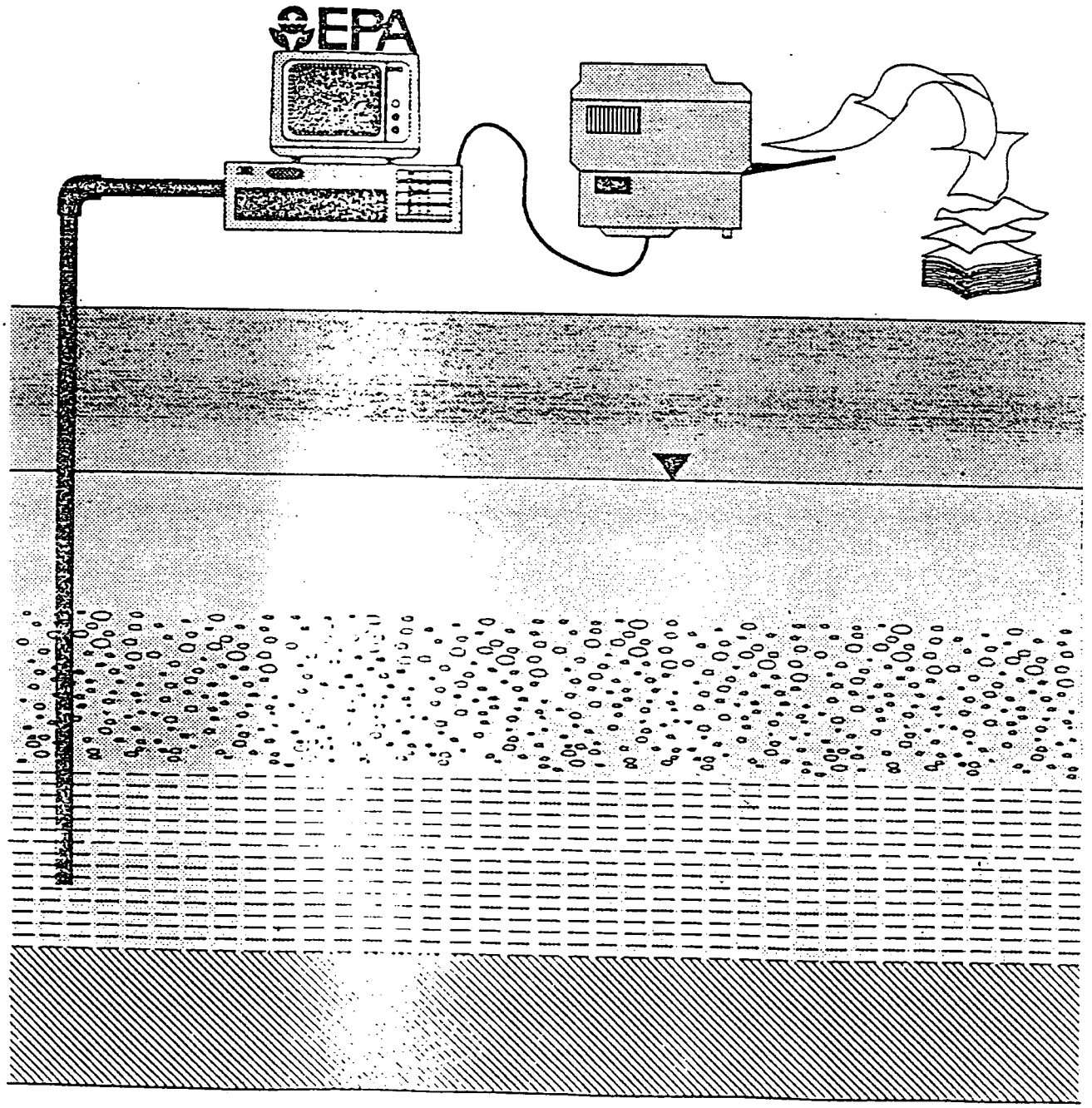
ORDER

R10 7500.1

August 15, 1989

WATER - GENERAL

REGION 10
GROUND-WATER DATA MANAGEMENT



Dist: Regional Directives

Initiated by: WD

1.0 PURPOSE

The purpose of this Order is to establish consistent procedures for organizing, reporting, transmitting, storing and retrieving ground-water data. Ground-water data management procedures implemented under this Order will significantly enhance the ability of EPA to efficiently administer programs generating and using ground-water information. Implementation of this Order will improve the efficiency and effectiveness of EPA's resources and the quality and timeliness of management decisions.

2.0 APPLICABILITY

This Order applies to all ground-water data collection activities directly carried out by EPA staff or EPA contractors, including research and development, enforcement, and permit issuance. Provisions of the Order apply to EPA personnel, contractors or consultants to EPA, and to other entities that are collecting ground-water data at the direct request of EPA.

This Order does not apply to state/local grantees, or states collecting data under EPA delegated or other state programs. Also this Order does not apply to other federal agencies acting outside of the scope of EPA authority. However, federal, state and local agencies are encouraged to adopt similar data management policies to facilitate efficient sharing of ground-water data within the states of EPA Region 10.

3.0 BACKGROUND

Numerous EPA programs involve the collection and assessment of ground-water data. EPA is frequently responsible for making highly sensitive decisions regarding the disposition of ground-water resources.

Currently, very little of the ground-water data collected by or requested by EPA is available in a readily usable form. Ground-water data submitted to EPA is virtually always in the form of voluminous paper reports. This format precludes the ability of staff to perform rapid analysis of spatial and temporal trends; instead, staff must engage in laborious and time-consuming page-by-page hand interpretation and assessment of the information. In addition, the evaluation of ground-water data cannot always be effective because of improper or missing location coordinates, inadequate information on physical characteristics of wells, and inconsistent sample analytical and quality assurance data. Regional project managers and technical staff are continually at a disadvantage during technical meetings with the regulated community because of the unavailability of a centralized, standardized regional ground-water data repository upon which analytical tools for data interpretation and presentation can be applied. In most cases, the regulated community data-generating entities already use some type of computer database files for storage of ground-water data for their own internal purposes. Actual data, however, are usually submitted to EPA in the form of paper copies of computer printouts.

This Order will establish appropriate procedures to ensure that ground-water data submitted to EPA is encoded, stored, and presented in a magnetic media format (i.e., diskette or tape) so that data can be readily downloaded into an EPA data system. Implementing this Order will preclude the necessity of laborious hand-interpretation and allow rapid assessment by EPA staff.

This Order will also provide a new capability for EPA to rapidly perform regional summaries of environmental quality. The availability of a centralized ground-water data system will allow EPA to quickly summarize and present analytical data portraying the condition of ground-water resources of EPA Region 10. EPA will need this capability to effectively tabulate Environmental Indicators, a national effort which will receive increased emphasis during the next few years. These new capabilities will also enhance EPA's ability to conduct regional risk assessments.

4.0 DEFINITIONS

4.1 Documentation:

A written record furnishing information that a procedure has been performed and how it was performed.

4.2 Ground-water data:

For the purposes of this Order, ground-water data is comprised of two categories: Sampling station location and descriptive information, and sample analytical data. The specific components of each of these categories are given respectively in Sections 6.2.1.1 and 6.2.2.1 of this Order. These data elements are derived from the EPA National Order No. 2150, "Minimum Set of Data Elements for Ground Water."

4.3 Generation/collection of ground-water data:

The construction of a ground-water monitoring well; the collection of a water sample from such a monitoring well, a drinking water well, or other type of well, springs, or any other source of ground water; performance of chemical, physical, and/or biological analyses by or under the direction of EPA.

4.4 Location:

The exact location of a ground-water sampling station, usually a well, as determined by standard surveying procedures. The location may be given in Latitude and Longitude coordinates, accurate within one-tenth of a second; or, in Universal Transverse Mercator (UTM) system coordinates (accurate to the nearest meter), or in State Plane System coordinates (accurate to the nearest foot).

4.5 Project manager:

Any EPA staff member responsible for coordinating activities on a specific site, group of sites, or investigation projects where collection of ground-water data is conducted. This includes but is not limited to Superfund and RCRA site managers, on-scene coordinators, special study coordinators, etc.

4.6 Regulated community:

Any public or private entity being regulated under one or more laws or regulations listed under Subsection 4.2. This includes, but is not limited to potentially responsible parties, federal facilities, specific industries, public utilities, municipalities, etc.

4.7 Site:

4.7.1 Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund): Hazardous waste site.

4.7.2 Resource Conservation and Recovery Act (RCRA) Facility: Facility.

4.7.3 National Pollution Discharge Elimination System (NPDES): Discharge Point and vicinity where ground-water monitoring activities are conducted.

4.7.4 Public Water Supply (PWS): Wellhead or key well in a well field, or a reservoir outlet.

4.7.5 Underground Injection Control (UIC): Wellhead or a key UIC well in a wellfield.

4.7.6 Underground Storage Tanks, Leaking Underground Storage Tanks (LUSTs): Tank areas where ground-water monitoring activities are conducted.

4.8 Station:

A well, spring, or other sampling point at which a ground-water sample is collected.

5.0 RESPONSIBILITIES

The following individuals, groups or entities shall be responsible for conducting the following tasks and implementing the provisions of this Order described in Section 6, "Data Management Procedures".

5.1 The Region 10 Ground Water Task Force will provide oversight of this Order by conducting annual assessments of the operating procedures and recommending modifications if appropriate.

5.2 EPA Division Directors shall be responsible for the implementation of this Order within their respective Divisions. They shall arrange for appropriate training and orientation opportunities for their staff.

5.3 The Environmental Services Division (ESD), Laboratory Branch, shall encode and input the results of all ground-water sample analyses performed at the Laboratory (including associated assessment of quality of data). Data shall be entered into the Laboratory Sample Data Management System. In addition, for projects conducted directly by EPA staff, the Laboratory shall encode and input ground water data sample analyses performed by contract laboratories.

5.4 ESD, Ambient Monitoring and Analysis Branch (AMAB), shall have responsibility in the following areas:

5.4.1 AMAB shall provide guidance and training as appropriate to EPA staff, consultants, contractors, or others, upon request, to ensure that ground-water data submitted to EPA is properly encoded in accordance with procedures detailed in Section 6.

5.4.2 AMAB shall be responsible for determining the disposition of the data received by EPA, and transferring data to the appropriate EPA data management system (e.g., STORET; Region 10 Ground-Water Site Inventory database; the Geographic Information System, or the Ground-Water Workstation).

5.4.3 AMAB shall effect the transfer of ground-water data from the Laboratory Sample Data Management System to a data system in use at the Regional Office (see 5.4.2, above), for data generated as a result of sampling activities conducted directly by EPA staff. In such cases AMAB shall be responsible for entry of sampling station descriptive information into the appropriate related database.

5.4.4 AMAB shall code and enter historical data, and data collected under ongoing agreements, in accordance with the provisions of this Order, and as time and resources allow.

5.5 ESD, Office of Quality Assurance shall consider this Order when reviewing sampling plans and, upon receipt and review of data, make recommendations for data quality and usability.

5.6 All EPA field staff collecting or generating ground-water data in the field shall be responsible for tabulating sampling station descriptive information described in Section 6. Such tabulations must be submitted to AMAB.

5.7 Hazardous Waste Division (HWD), Superfund Branch staff (Site Managers and others) shall, where appropriate, require that ground-water data management procedures described in Section 6 be implemented in all actions involving collection of ground-water data. These actions include all of the following:

- Preliminary Assessments/Site Investigations
- Remedial Investigations
- Feasibility Studies
- Remedial Design/Remedial Action
- Operation and Maintenance

The procedures shall be required for all ground-water data collection activities conducted under the following circumstances:

- Directly by EPA;
- By any contractors or consultants tasked by EPA;

- By "potentially responsible parties" acting under terms of a consent decree or order;
- By federal facilities acting under EPA direction or under terms of a federal facility agreement and/or consent order.

Implementation of the procedures shall be effected by incorporating appropriate language directly into contracts, work plans, work assignments, work orders, consent decrees, consent orders, interagency agreements, or other appropriate documents.

5.8 HWD, Superfund Branch on-scene coordinators shall, where appropriate, require implementation of Section 6 data management procedures for all data collected during the course of a response to an emergency incident or during an immediate removal action.

5.9 HWD, Waste Management Branch staff (i.e. RCRA permit writers, compliance officers, and others) shall, where appropriate, require implementation of Section 6 data management procedures for all actions involving collection of ground-water data. These include all of the following:

- RCRA Facility Assessments
- RCRA Facility Investigations
- Corrective Measures Studies
- Corrective Measures Implementation
- Any other permit provision or compliance/enforcement action.

5.10 Water Division and Operations Offices LUST/UST coordinators and staff shall require implementation of Section 6 data management procedures for all tank investigations and clean-ups that involve generation of ground-water data.

5.11 Water Division and Operations Offices NPDES program staff shall incorporate Section 6 data management provisions into any NPDES permit language that requires collection of ground-water monitoring data.

5.12 Water Division, Drinking Water Programs Branch staff and Office of Ground Water staff shall require implementation of Section 6 data management procedures for all special projects that involve collection of ground-water data. Examples of such projects are:

- High Plains Groundwater Recharge Demonstration Program
- Occasional special drinking water contamination studies
- Underground Injection Control Program monitoring

6.0 DATA MANAGEMENT PROCEDURES

6.1 GENERAL PROCEDURES

A data management plan shall be prepared for all EPA Region 10 activities involving ground-water sampling and analysis of data collected in the field. The plan shall incorporate the general provisions given in subsections 6.1.1 through 6.1.5. Data encoded and stored in accordance with subsections 6.1.1 through 6.1.5 shall be transferred to EPA in consultation with ESD AMAB data management staff. The data management plan shall be subject to EPA approval. AMAB will provide review assistance to all other EPA units reviewing data management plans.

6.1.1 A unique identification code shall be assigned to all monitoring and sampling stations.

6.1.2 Location data and descriptive information shall be recorded and encoded for all monitoring and sampling stations.

6.1.3 All sample analytical results, field measurements, and observations must be identified, recorded, encoded, and stored in accordance with one of the options given in Section 6.2.

6.1.4 Analytical results and other observations shall be correlated with respective sampling station location and descriptive information, by use of common identification codes assigned to station locations.

6.1.5 Location data, descriptive information, analytical results, field measurements, and any other observations of information recorded shall be encoded and stored in accordance with Section 6.2.

6.2 DETAILS OF DATA MANAGEMENT PROCEDURES

6.2.1 Station Location and Descriptive Information

6.2.1.1 Descriptive Information Categories

All station location and descriptive information shall be tabulated, encoded, and entered into a database (or database compatible file system). The following categories of information (fields) are required for each sampling station. (These fields are those described in the EPA National Order No. 2150, "Minimum Set of Data Elements for Ground Water.")

a. Unique station identification code number: a 1 to 12 digit alphanumeric code

b. Location (see Definitions, Subsection 4.4)

c. Method of determination of location

d. Elevation, reference point (for example, top of casing) and datum used

e. Sampling station use (e.g., drinking water well, monitoring well, etc.)

f. Depth of well at completion

g. Depth to top of open interval

h. Depth to bottom of open interval

i. Availability and location of well log

j. Type of well log

k. Date of installation or construction

m. Water level at time of installation or construction

n. Depth to water at time of installation or construction

o. State Federal Information Procedures System (FIPS) code

p. County FIPS code

q. Any additional fields contained in the Region 10 Ground Water Site Inventory (GWSI) Database are optional

6.2.1.2 Descriptive Information Encoding and Storage Procedures

The data assigned to each field shall be entered into one of several types of database structures, described as follows: (All fields must be in EPA-specified formats and units. A data element dictionary document will be provided by EPA to data generators).

a. (Preferred option) The Region 10 GWSI dBase III+ database - Region 10 will provide the database shell upon request, before data entry

b. Any alternative dBase III+ compatible file

c. An ASCII comma delimited file or ASCII fixed format (dBase SDF) file, upload compatible to dBase III+

d. A Lotus-compatible spreadsheet with fields across top (i.e. fields are columns)

6.2.2 Sample Analytical and Water-Level Data

6.2.2.1 Categories (Fields)

All sample analytical data and water level data shall be tabulated, encoded, and entered into a database (or database compatible file system). The following categories of information (fields) are required for each sampling event at each station. (These fields are those described in the EPA National Order No. 2150, "Minimum Set of Data Elements for Ground Water.")

a. Station location identification code

b. Date of sampling event

c. Sample identification code

d. Agency requesting sampling data (usually EPA)

e. Analytical parameters measured (compound names, and respective STORET parameter codes, or CAS numbers)

f. Concentration (or other) value of parameter measured

g. Confidence factor (field and lab quality assurance data qualifiers)

h. Measurement quantification

i. Depth to water at time of sample collection

6.2.2.2 Sample Analytical and Water Level Data Encoding and Storage Procedures

a. PC STORET/STORET compatible database or data storage cards (EPA will provide database shell);

b. Lotus spreadsheet compatible with EPA lotus/STORET conversion utilities;

c. dBase file compatible with EPA dBase/STORET conversion utilities;

d. Other formats as approved by EPA AMAB data management staff.

7.0 EFFECTIVE DATE

7.1 The effective date for this Order is October 1, 1989.

8.0 REFERENCES

8.1 EPA National Order NO. 2150, "Minimum Set of Data Elements for Ground Water".

Date

Clark Gaulding
Management Division Director

Date

Robie G. Russell
Regional Administrator